MASTER

PSX1000 and PSX500

Parallel Programmers

User Manual

Ver 3.4

DATA I/O

981-0306-004

Customer Advisory

SYMPTOM: **Overcurrent Error on initial Load from Master**

PRODUCT AFFECTED: **PSX500, PSX1000**
Version 3.4

PERFORMANCE IMPACT: **No adverse impact**

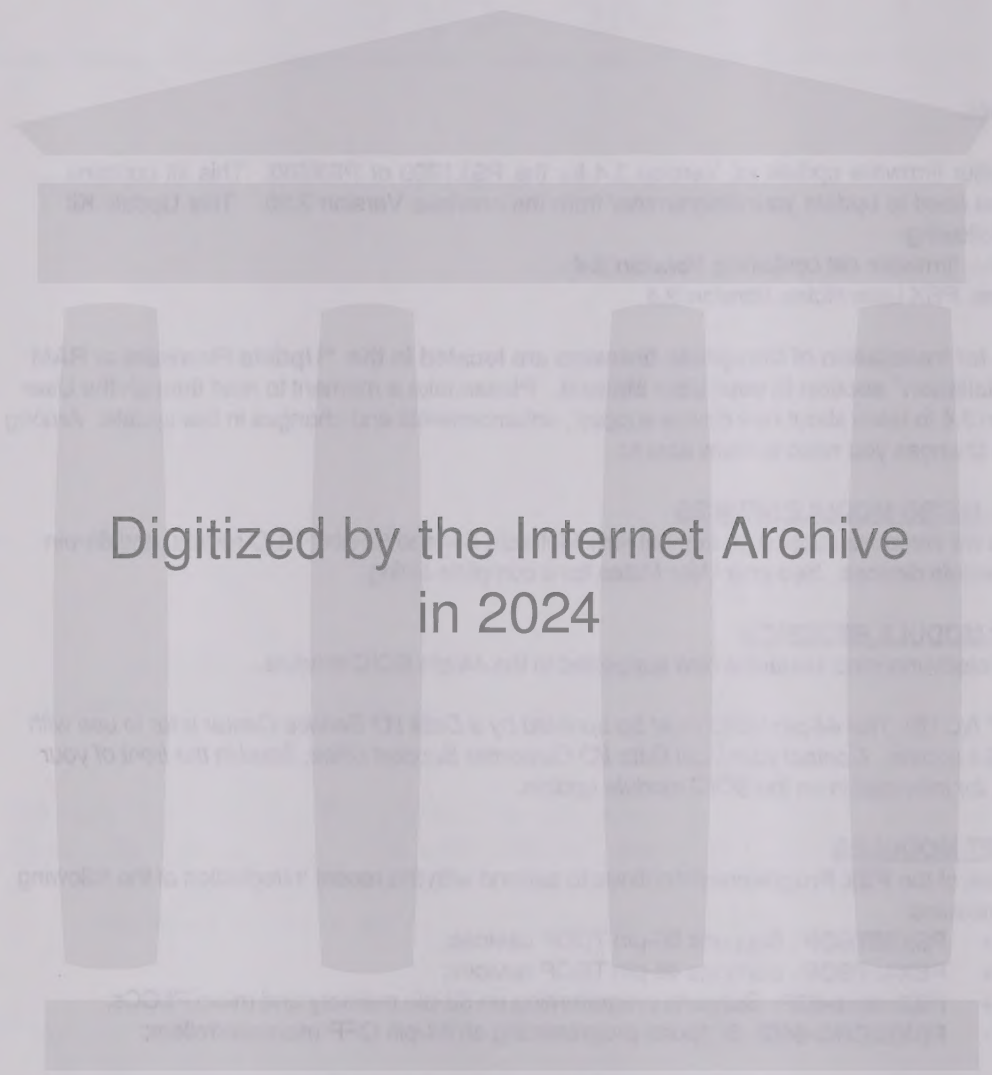
Final test of this firmware release revealed that the first use of the "Load from Master" command after power up of the programmer with version 3.4 may cause an incorrect **Overcurrent Error** display.

If you experience this initial **Overcurrent Error,** simply press **EXIT** and rerun the "Load from Master" operation. If you use Tasklink software to control the PSX, simply rerun the "Load from Master" operation to clear the invalid error message. This symptom does not affect the quality of the subsequent programming operations.

While harmless, the incorrect Overcurrent Error display causes some minor inconvenience to users. We carefully weighed the impact of this inconvenience against the benefits of the new device support offered in version 3.4, and in the interest of expeditious delivery of new device support we have opted to correct it in PSX Version 3.5, which is planned for Fall 1995.

For Technical assistance or information, please contact your local Data I/O office. Locations are listed in the front of your user manual.

DATA I/O



Digitized by the Internet Archive
in 2024

https://archive.org/details/manualsplus_03237

PSX1000 and PSX500

Parallel Programmers

User Manual

Ver 3.4

DATA I/O

981-0306-004

Installing Devices in Rail Sockets 3-4
DIP Devices 3-5
PLCC Devices 3-7
SOIC, TSOP, and QFP Devices 3-9
Memory Cards 3-11
Operating the PSX in Local Mode 3-12
1. Set Up the PSX..... 3-12
2. Install Devices for Load or Copy Operation... 3-13
3. Set Device Parameters 3-14
4. Load Data From Master Devices 3-15
5. Program Devices 3-16
6. Completing the Job 3-16
7. Troubleshooting..... 3-16
8. Turning Off the Power..... 3-18

4. Commands

Command Summary 4-1
Command Listing 4-1
PSX Command Structure (Menus)..... 4-2
Copy From Master..... 4-4
Copy From RAM 4-6
Copy From Set 4-8
Diagnostics 4-10
Load From Master 4-12
Load From Set..... 4-13
Load Thru Port..... 4-15
Remote Control..... 4-16
Enable/Disable CRC..... 4-16
Remote On/Off = 00 00 4-16
Send Thru Port 4-17
Set Device Options..... 4-18
Electronic ID (On) 4-18
Device Test (On) 4-19
Select Security Option (Array only) 4-19
Enable/Disable Checksum Calculation (On) 4-20
Select Checksum Display Width (8 digits) 4-20
Select Checksum Calculation Mode (Bytewise) .. 4-20
Select Device List 4-21
Attribute Memory (On) 4-21
Set Lockbits 4-22
Set I/O Options 4-23
I/O Format (Intel MCS)..... 4-23
Address Offset (First Address Downloaded) 4-24
Handshake Option (0) 4-25
Timeout (30) 4-25
Set Operation Options..... 4-26
Select Beeper Pitch (7)..... 4-26
Select Setsize (1) 4-27
Select Bitsize (8) 4-27

Set Rail Mode 4-27
Using Alternate Rail Mode 4-27
Set Error Options 4-28
Rail Mode (Parallel) 4-29
Resetting System Parameters 4-30
Open Socket LED (Red) 4-30
Set Port Options 4-31
Active Port (Serial) 4-31
Baud Rate (9600) 4-31
Parity (Off) 4-31
Stop Bits (1) 4-32
SmartPort (On) 4-32
Hardware Translators (On) 4-32
IEEE-488 Address (1) 4-32
Set RAM Options 4-33
Set Data Lock (Off) 4-33
Set Beginning RAM Address (000000) 4-34
Set Block Limit (Device size) 4-34
Clear RAM 4-35
Invert RAM 4-35
Set Word Order for 16-bit Devices (Low/high) . 4-36
Set Variable Parameters Options 4-37
Set Verify Options 4-38
Select Number of Verify Passes (2) 4-38
Select 1 Pass or 2 Pass Verify Voltage Levels (Manufacturer-recommended) 4-39
Set to Default Levels 4-39
Statistics 4-40
Control Module 4-40
Socket Modules 4-42
Verify From Master 4-45
Verify From RAM 4-47
Verify From Set 4-48
Verify Thru Port 4-50
View Configuration 4-51
View Master Checksum 4-52
View Master ID 4-53
Translation Formats 4-54
Application Notes 4-54

5. Troubleshooting

Common Problems 5-1
Diagnostics 5-3
Full System Test 5-3
CPU Test 5-3
Rail Test 5-3
Socket TTL Test 5-4

Socket Voltage Test 5-6
Socket Driver Test 5-8
Socket LED Test 5-15
Waveform Observation 5-15
DRAM and I/O Test 5-15
Theory of Operation 5-16
List of Boards 5-16
Operation 5-17
Block Diagrams 5-17

6. Messages

7. Maintenance

Spare Parts 7-1
Reducing Electrostatic Discharge 7-2
Disassembling the PSX 7-3
Control Module Disassembly and Reassembly ... 7-3
Disassembling Socket Modules 7-3
Cleaning the PSX 7-4
Removing the Bottom Cover 7-5
Replacing the Lithium Battery 7-6
Disassemble the PSX 7-6
Remove the Old Battery 7-7
Install a New Battery 7-8
Reassemble the PSX 7-8
Replacing the Line Fuse 7-9
Updating Firmware or Installing a RAM Upgrade .. 7-12
Disassemble the PSX 7-12
Locate Sockets on CPU Board 7-13
Remove Old Firmware or SIMMs 7-14
Install New Firmware or SIMMs 7-14
Reassemble the PSX 7-15
Perform Powerup Test 7-16

A. Technical Assistance, Warranty, and Repair

Data I/O Customer Support A-1
Technical Assistance A-3
Calling A-3
Sending a Fax A-3
Sending E-mail A-3
Using the BBS A-3
Bulletin Board Service A-4
Warranty Information A-4
Keep Current Subscription Service A-5
Repair Service A-5
User Registration and Address Change A-5

B. Using an IEEE-488 Interface

Installation B-1
Installing Multiple Devices B-2
Installing Multiple Boards B-2
Using the IEEE-488 Connection B-3
The PSX as a Dedicated Application (TaskLink) .. B-4
The PSX as an IEEE-488.2 Bus Device (National Instruments) B-5

C. Specifications

Specifications C-1
Power Requirements C-1
Physical C-1
Functional C-2
Environmental C-3
Safety C-3
Electromagnetic Interference C-3
Electrostatic Discharge (ESD) C-3
Factory Default Settings C-4
Safety Summary C-5

D. Service

Reducing Electrostatic Discharge D-1
Disassembling the PSX D-1
Spare Parts D-1
Socket Warranty and Replacement D-2
Socket Replacement for DIP48 Socket Modules D-3
Package Contents D-3
Disassembly D-3
Removing Old Sockets D-4
Installing New Sockets D-5
Reassembly D-5
Socket Board Replacement for PLCC, SOIC, TSOP, and QFP Socket Modules D-7
Package Contents D-7
Disassembly D-7
Removing Old Socket Board Assemblies D-8
Installing New Socket Board Assemblies D-9
Reassembly D-9
Socket Replacement for PLCC Hinged-top Socket Modules D-10
Package Contents D-10
Disassembly D-10
Removing Old Sockets D-11
Installing New Sockets D-11
Reassembly D-12

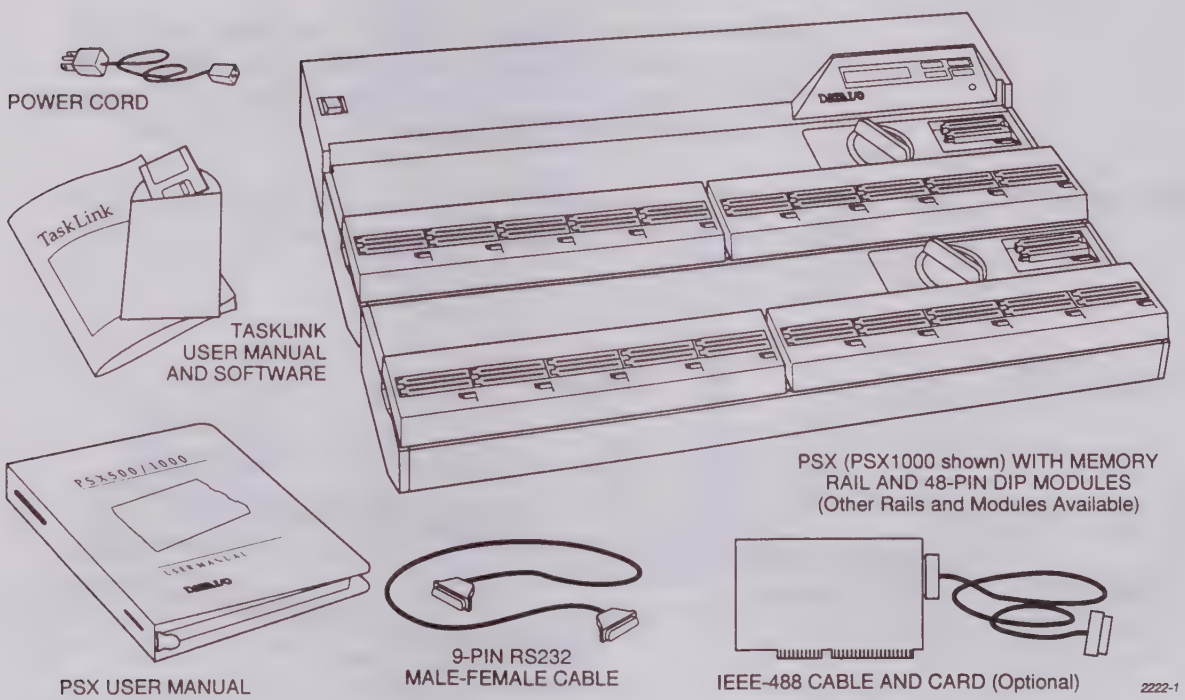
Socket Board Replacement for 68MEMCARD Socket Modules D-13
Package Contents D-13
Disassembly D-13
Removing Old Socket Board Assemblies D-15
Installing New Socket Board Assemblies D-15
Reassembly D-16
Socket Replacement for Micro, 40-pin, and 28-pin Rails D-17
Package Contents D-17
Removing Old Sockets D-17
Installing New Sockets D-19
Master Socket Replacement D-21
Removing Old Socket D-21
Installing New Socket D-23
Calibrating the PSX D-24
Disassembly D-25
Calibration Procedure D-27
Reassembly D-31

Before You Begin

Before you start setting up or using your PSX, read the information presented in this section to become familiar with the PSX package and this User Manual.

Package Contents

The items that are included in the PSX package are shown below. The 9-pin RS232 cable is used with the standard PSX (serial) configuration. The IEEE card and cable are included only if you purchased the IEEE PSX (parallel) configuration.



Product Definition

The PSX Parallel Programmer is a menu-driven production programmer designed for fast programming and continuous, reliable operation. The PSX programmer can program the following device types:

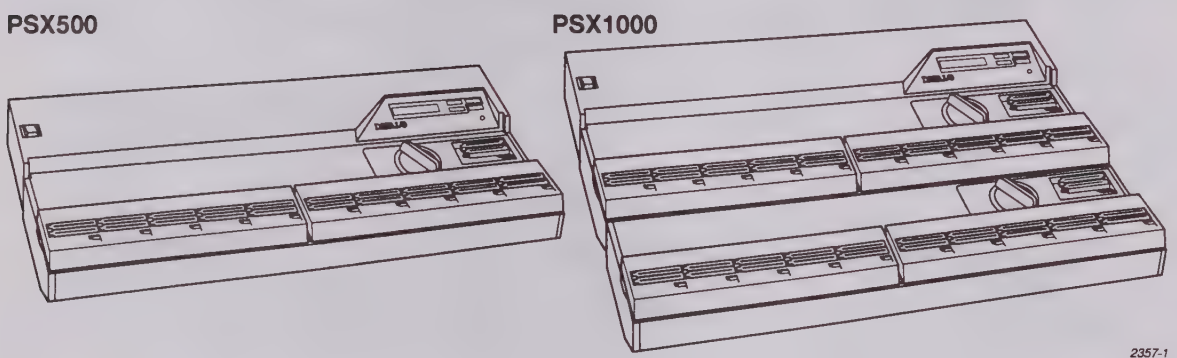
- MOS and CMOS one-time programmable (OTP) PROMs
- EPROMs and EEPROMs
- PCMCIA standard 68-pin memory cards
- PLCCs and SOICs
- Microcontrollers (microprocessors with on-chip programmable memory)

The PSX programmer can be configured as follows:

- **Standard PSX** — Processes devices in local (stand-alone) mode or in remote mode (attached to a PC using a RS232C 9-pin serial cable).
- **IEEE-488 PSX** — With the addition of the IEEE option, the PSX can use the high-speed downloading capabilities of an IEEE-488 interface to a PC. (See "Set Port Options" on page 4-31 for information on using the PSX's IEEE-488 port.)

PSX Systems

A series of parallel programmers is available from Data I/O, including the high-end PSX1000 programmer and the PSX500 programmer.



Control Modules

The PSX1000 programmer consists of a PSX1000 control module, which can hold one or two memory rails.

The PSX500 programmer consists of a PSX500 control module, which can hold one memory rail; the PSX500 is not upgradeable to a two-rail system (PSX1000).

Memory Rails

The Memory rail requires socket modules (socket modules are installed into the Memory rail and then devices are inserted into the socket modules). Many socket modules are available for programming devices of different package types.

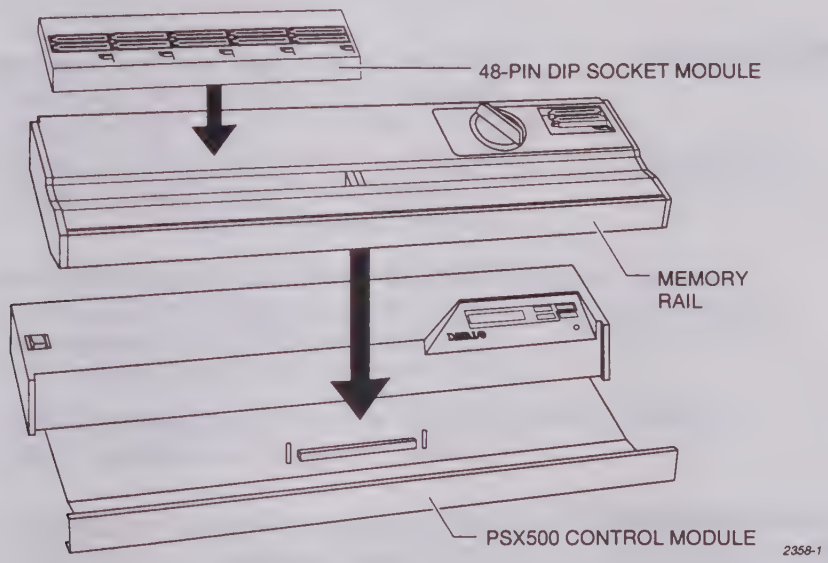
For a description of available rails, refer to "Rails and Socket Modules" on page xiv.

Socket Modules

Socket modules (which are installed on the PSX **Memory** rails) are designed to interface the PSX with specific devices and device types. For example, the 28-pin DIP module supports operations with 28-pin DIP devices. For a list of available socket modules, refer to "Rails and Socket Modules" on page xiv.

Putting the Pieces Together

The illustration below shows how socket modules, rails, and the control modules fit together. The illustration shows a PSX500 control module with a Memory rail and 48-pin DIP socket module.



How the PSX Works

The basic function of the PSX programmer is to copy data from one or more master devices to blank devices. The typical steps in this process are:

1. Load the data from one or more master devices inserted in module sockets starting with socket 1. The data is loaded into the programmer's RAM.
2. Remove the master device(s).
3. Insert (install) the blank device(s) starting with socket 1.
4. Program the blank devices from the data in the programmer's RAM. You can program a set of up to 30 devices (depending on which socket modules are installed).
5. Compare the checksum value of the programmed device(s) to the master device(s) to verify the operation was successful.

In addition, for DIP devices, you can copy data directly from a master device inserted in the master socket (labeled **Master socket** on the PSX) to other DIP devices.

The PSX supports many more operations, including diagnostics and load through port, described later in this manual.

Device Support

Rails and socket modules (which are installed on the PSX **Memory** rails) are designed to interface the PSX with specific devices and device types. For example, the 48-pin DIP module supports operations with 28-, 32-, and 48-pin DIP devices. Refer to "Rails and Socket Modules" on page xiv for a list of available rails and socket modules.

Many different rails and socket modules are available for programming devices. For a list of supported devices and the rail or socket module that is required for specific devices, refer to the **Device List** (see "Device Support" on page 3-1).

To order additional socket modules, contact your nearest Customer Support office as listed in Appendix A.

Specifications and Factory Settings

See Appendix C for the PSX product line specifications and factory default settings.

Safety Information

Definitions

WARNING statements identify conditions or practices that could result in personal injury or loss of life.

CAUTION statements identify conditions or practices that could result in damage to equipment or other property.

Additional Safety Information

See the "Safety Summary" in Appendix C.

Options

The PSX product line offers the following options, which are described in the following paragraphs:

- Variable parameters
- RAM upgrade
- Updates
- Rails and Socket Modules
- Spare Parts

To order any available option, contact your nearest Customer Support office as listed in Appendix A.

Variable Parameters

Variable Parameters enables you to modify algorithm-related parameters for programming devices that need more rigorous programming and/or verification.

RAM Upgrade

The PSX is shipped to you with 1 MB of RAM (SIMMs). Upgrades are available.

Updates

As new device programming capabilities become available, Data I/O offers user-installable update kits for the PSX programmers. These update kits include firmware PROMs.

Data I/O also offers update contracts and Full Service Agreements, which provide automatic shipment of updates, plus calibration and repair of your equipment. For information on purchasing support contracts, contact your nearest Customer Support office as listed in Appendix A.

Rails and Socket Modules

To increase the number or types of devices that your PSX can program, you can purchase additional rails and socket modules. New rails and socket modules may become available periodically.

Note: Rails are interchangable between the PSX1000 and PSX500. The only difference is that the PSX1000 can hold two rails and the PSX500 can only hold one rail.

Supported Rails

The PSX supports the Memory Rail. The MEMORYRAIL requires two socket modules and programs memory devices and microcontrollers (see the following "Socket Modules" section). In addition to the memory rail, for backwards compatability, the following rails are supported:

- **Micro Rails** — Two rails are available. Each contains ten microprocessor sockets.
  - MICRORAIL-DIP for programming 40-pin DIPs
  - MICRORAIL-44P for programming 44-pin PLCCs
- **28-pin Rail** — The SR28 contains 15 DIP sockets and programs 24- or 28-pin EPROMs.
- **40-pin Rail** — The SR40 contains 10 DIP sockets and programs 32- or 40-pin EPROMs and microcontrollers.

Supported Socket Modules

Socket modules are supported only on the **Memory** rail. Each Memory rail supports up to two socket modules and each socket module has five sockets. The available socket modules are listed below.

Socket Module	Description
DIP48	Programs 48-pin DIP devices
32PLCC(28)	Programs 32-pin PLCC devices derived from a 28-pin DIP (push/pop sockets)
32PLCC(28)HT	Programs 32-pin PLCC devices derived from a 28-pin DIP (hinged top sockets)
32PLCC(32)	Programs 32-pin PLCC devices derived from a 32-pin DIP (push/pop sockets)
32PLCC(32)HT	Programs 32-pin PLCC devices derived from a 32-pin DIP (hinged top sockets)
44PLCC	Programs 44-pin PLCC devices (push/pop sockets)
44PLCCHT	Programs 44-pin PLCC devices (hinged top sockets)
68MEMCARD	Programs 68-pin PCMCIA 2.0 memory cards
28SOIC-300	Programs 28-pin EPROM/EEPROM SOICs with 0.300-inch wide packages (28-pin DIP equivalents only)

Socket Module	Description
40SOIC-450	Programs 40-pin EPROM/EEPROM SOICs with 0.450-inch wide packages (40-pin DIP equivalents only)
44SOIC-530	Programs 44-pin EPROM/EEPROM SOICs with 0.530-inch wide packages
28TSOP	Programs 28-pin TSOPs in either the forward or reverse pinout
32TSOP	Programs 32-pin TSOPs in either the forward or reverse pinout
40TSOP	Programs 40-pin TSOPs in either the forward or reverse pinout
48TSOP-F	Programs 48-pin TSOPs in the forward pinout
48TSOP-R	Programs 48-pin TSOPs in the reverse pinout
56TSOP	Programs 56-pin TSOPs in either the forward or reverse pinout
MICRO-DIP	Programs up to 48-pin DIP micro-controlled devices
MICRO-44PLCC	Programs 44-pin PLCC micro-controller devices
MICRO-52PLCC	Programs 52-pin PLCC micro-controller devices
MICRO-64QFP	Programs 64-pin QFP micro-controller devices

For a complete and current listing of available options and configurations, contact your nearest Customer Support office as listed in Appendix A.

Replacement Sockets

User-installable socket replacement kits are available from Data I/O.

When the sockets have reached the warranted number of insertion cycles per socket, the PSX generates a message. You should replace the sockets at this interval (for example, all DIP sockets, including rail and socket module sockets, are warranted for 25,000 insertion cycles). See the "Socket Warranty and Replacement" section on page D-2 for socket replacement kit part numbers, socket warranties and socket replacement instructions.

Spare Parts

Spare parts are available from Data I/O. Call the Service Dispatch Group at 800-735-6070 to request spare parts.

About this Manual

Manual Summary

A description of each chapter in this manual can be found in the Table of Contents.

Typographic Conventions

Throughout this manual different typographic conventions represent different cases of input and output.

Programmer Keys

The PSX programmer keys, [ENTER], [EXIT], [^], and [v], appear throughout the manual in boxes, as they do here.

PC Keyboard Keys

PC keyboard keys appear in boxes (for example, [Q]) or as bolded text.

The **Enter** key (or on some keyboards, the **Return** key) is represented by this symbol: [↵].

Displayed Text

Text displayed on an LCD or screen appears in a typewriter-like typeface.

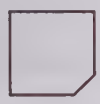
```
You will see this text displayed on the screen.
```

Programmer Symbols

This symbol on equipment indicates that the user should consult the manual for further detail.

V~ This symbol stands for V ac, for example, 115 V ~ = 115V ac.

This symbol denotes a ground connection for a signal or for an antistatic wrist strap with impedance of 1 MΩ (minimum) to 10 MΩ (maximum).



This symbol describes how to insert devices into PLCC sockets. Insert the device label side up with the notched corner in the lower right.

This symbol describes how to insert devices into PLCC sockets. Insert the device label side up with the notched corner in the upper right.

The two symbols to the left describe how to insert devices into DIP sockets. Insert the device into the socket so that the notched end is on the left and so that the device is aligned with the right side of the socket.

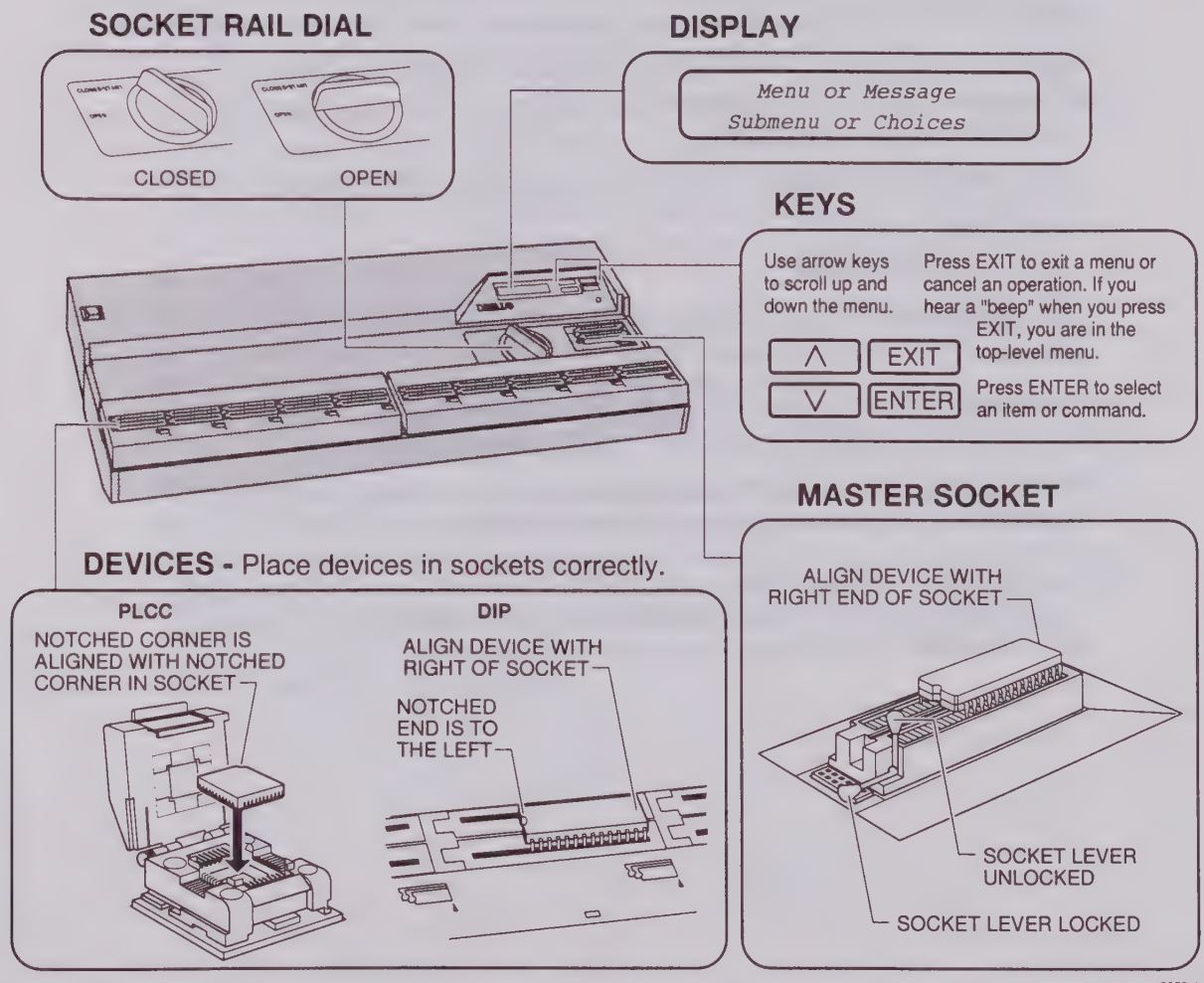
1 Getting Started

This chapter briefly describes how to set up your PSX parallel programmer for **Local (stand-alone) operation**. This chapter also contains a **tutorial** that describes how to use your PSX to program devices.

If you need more detailed information on how to set up the PSX, or if you wish to set it up to interface with a PC, refer to Chapter 2, "Setup."

If your programmer is already set up and you are already familiar with operating the PSX, refer to Chapter 3, "Operation."

Getting to Know the PSX


SOCKET RAIL DIAL
CLOSED
OPEN
DISPLAY
Menu or Message
Submenu or Choices
KEYS
Use arrow keys to scroll up and down the menu.
Press EXIT to exit a menu or cancel an operation. If you hear a "beep" when you press EXIT, you are in the top-level menu.
EXIT
ENTER
Press ENTER to select an item or command.
MASTER SOCKET
ALIGN DEVICE WITH RIGHT END OF SOCKET
SOCKET LEVER UNLOCKED
SOCKET LEVER LOCKED
DEVICES - Place devices in sockets correctly.
PLCC
NOTCHED CORNER IS ALIGNED WITH NOTCHED CORNER IN SOCKET
DIP
ALIGN DEVICE WITH RIGHT OF SOCKET
NOTCHED END IS TO THE LEFT
2359-1

Quick Start

The following procedure summarizes the steps needed to set up and install your PSX to run in **local** mode. Chapter 2, "Setup," contains more detailed information.

1. Install rails and socket modules (if necessary).

Ordinarily, your PSX is shipped without rails or socket modules installed. To install the rails (and socket modules for the Memory rail) that you wish to use, refer to "Installing Rails" on page 2-2 and "Installing Socket Modules" on page 2-5 for instructions.

2. Make sure that all device sockets are empty.

Before turning on the power, make sure no devices are installed in your rail or module sockets and that the sockets are in the unlocked position.

Refer to "Installing Devices in Rail Sockets" on page 3-4 for more information.

3. Connect the power cord and turn on the power.

Refer to "Connecting the Power Cord" on page 2-7 for more information.

When you turn on the power, the PSX's system configuration is displayed for several seconds, after which the PSX will run a system test (which should last less than a minute).

If the system test completes successfully, the programmer displays

```
COPY FROM MASTER
^ OR v SCROLLS MENU
```

If the programmer displays a different message, see Chapter 6, "Messages," for an explanation.

If the system powers up but nothing is visible on the display, turn the display adjustment dial (see page 3-2) until the text is visible.

The programmer is now ready for operation in local mode. Proceed to "Tutorial" on the next page for operating instructions.

Note: Local mode (stand-alone mode) operation uses the keys and display on the PSX front panel. Remote mode operation uses an attached PC to control the PSX.

Tutorial: Programming Devices in Local Mode

This tutorial describes step by step how to load data from a master device or master set of devices and copy the data to blank devices.

Before you can program a device in local mode:

- The PSX must have the correct rail(s) installed. If you are using a Memory rail, two socket modules must be installed in each Memory rail.
- The PSX must have power turned on and be running in local mode (not running under TaskLink or Computer Remote Control).

See Chapter 2, "Setup," for more information.

Loading and Copying Data from Device(s) (Copy from Master, Load from Master, or Load from Set)

Note: Before starting this tutorial, make sure all device sockets on the PSX are empty.

From the top-level menu, select one of the following three commands (to select a command, use the arrow keys to move through the menus until the desired command is displayed, and then press [ENTER]).

- To copy from a single master device, select **Copy From Master**. Select this command only if you intend to copy data from a device in the master socket (see page 3-3 for information about master devices and sockets) directly to devices installed in module sockets. You can install only **DIP** devices into the master socket unless you use a socket adapter. (Go to page 1-4.)
- To load data from a single master device into the programmer RAM, select **Load From Master**. Select this command only if you intend to load data into RAM from a device in the master socket. You can program devices using the data in RAM. (Go to page 1-6.)
- To load from multiple master devices or from a **single non-DIP** device (if you are not using a socket adapter for the device), select **Load From Set**. This operation loads data from the device(s) into the programmer RAM. (Go to page 1-9.)

Note: To learn how to scroll through the PSX's menus, see page 3-2. If you have questions about the menus or get confused about where you are in the menus, see page 4-2.

Copy from Master

For programming directly from the master device installed in the master socket, select **Copy From Master**.

1. Scroll through the PSX menus and select **Copy from Master.** The selected manufacturer and device appear on the second line of the display. If no device is selected, `AUTO DEVICE SELECT` is displayed.

   Manually select the manufacturer name for the device (for example, AMD or Intel), then select the device from the list. When the correct manufacturer and device appear in the display, press [ENTER] .

   If you encounter problems, you might need to disable Electronic ID from the **Set Device Options** menu (see page 4-18). For information on electronic ID see page 3-15.

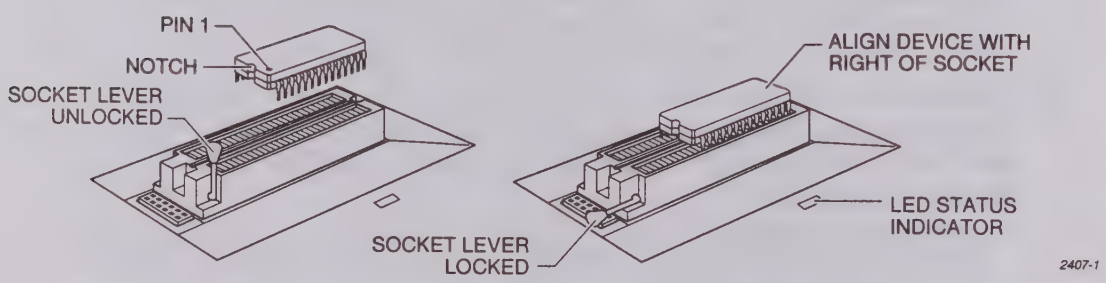
2. Perform the following step to install the master device into the master socket.

   The PSX displays

   ```
   INSERT DEVICES
   ENTER TO COPY
   ```

   Install the device you wish to copy data from. Installation of a DIP device is shown. See page 3-3 for instructions on how to install socket adapters if you wish to install a different device package.

CAUTION: ***Devices are static sensitive. Operate the PSX at an antistatic workstation. To avoid electric shock and damage to the devices, use an antistatic wrist strap containing a 1 MΩ (minimum) to 10 MΩ (maximum) isolating resistor.***



3. Insert the device(s) to be programmed into the module sockets (see "Installing Devices in Rail Sockets" on page 3-4). Insert the device(s) starting with socket 1. Make sure the devices are locked in.

4. Press [ENTER] to program devices.

   As the devices are programmed, the display is updated. The action symbol on the first line of the display indicates that the operation is in progress. The bars on the second line of the display advance to the right, indicating the percentage of the operation that is complete.

   The PSX displays

   ```
   TESTING DEVICES *
   ```

   ```
   PROGRAMMING DEVICES *
   0% ——— 100%
   ```

   ```
   VERIFYING DEVICES *
   ```

   When programming is complete, the LED below each socket that contains a device illuminates. (See page 3-17 for a description of what the colors represent.) If a light does not illuminate below a socket that contains a device, the device might not be seated and locked in the socket properly.

   If the devices programmed successfully, the PSX displays

   ```
   COPY COMPLETE - OKAY
   CHECKSUM=XXXX
   ```

   where *XXXX* represents the hexadecimal checksum of the data copied into the devices. (You can select the number of digits used in the checksum from the Set Device Options menu; see Chapter 4, "Commands," for instructions on changing the checksum display width.)

   If the devices did not program successfully, the PSX displays

   ```
   COPY COMPLETE - ERRORS
   ```

   and ERRORS is blinking.

   Use the arrow keys to scroll through the list of encountered errors. As you scroll through the errors, the LED status indicators light up yellow when the error currently displayed on the front panel occurred in the device in that socket.

   If none of the devices programmed and verified successfully, the PSX displays asterisks in place of the checksum.

5. Remove the programmed devices.

6. To repeat the programming operation for the same device type using the same master device, press [EXIT] and repeat steps 3 through 5.

7. After completing each job, record and clear programming statistics as described starting on page 4-40.

You have now completed the tutorial.

To go to a new operation, press [EXIT] . If you encountered problems, see "7. Troubleshooting" on page 3-16.

Load and Copy from RAM

To load data from a master device into RAM, select **Load from Master**. To program device(s) using the data in RAM, select **Copy From RAM**.

1. Scroll through the PSX menus and select **Load from Master**. The selected manufacturer and device appear on the second line of the display. If no device is selected, `AUTO DEVICE SELECT` is displayed.

Manually select the manufacturer name for the device (for example, AMD or Intel), then select the device from the list. When the correct manufacturer and device appear in the display, press **ENTER** .

If you encounter problems, you might need to disable Electronic ID from the **Set Device Options** menu (see page 4-18). For information on electronic ID see page 3-15.

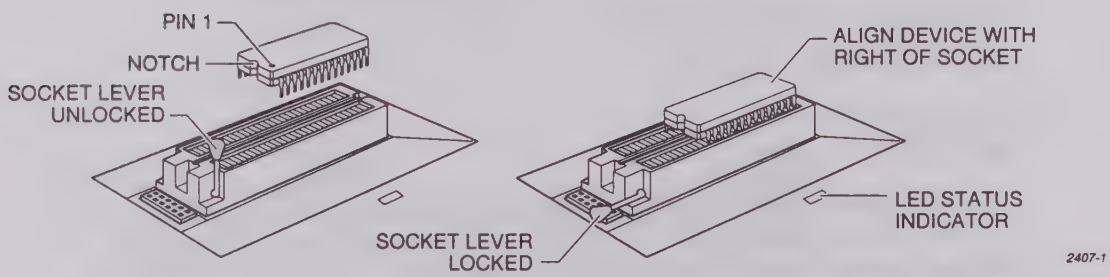
2. Perform the following step to install the master device into the master socket.

The PSX displays

```
INSERT MASTER
ENTER TO LOAD
```

Install the device you wish to copy data from. See pages 3-3 for instructions on how to install master devices and socket adapters.

CAUTION: ***Devices are static sensitive. Operate the PSX at an antistatic workstation. To avoid electric shock and damage to the devices, use an antistatic wrist strap containing a 1 MΩ (minimum) to 10 MΩ (maximum) isolating resistor.***



3. After you have installed the master device, press **ENTER** to begin the operation.

The PSX displays

```
LOADING FROM MASTER *
```

The action symbol (*) indicates that the operation is in progress. When the operation is complete, the PSX displays

```
LOAD COMPLETE - OKAY
CHECKSUM=XXXX
```

where XXXX represents the checksum of the loaded data (see "Troubleshooting" on page 3-16 for a description of checksum).

If an error occurs during the operation, the PSX stops the operation and displays a message. Correct the situation and press [ENTER] to try again, or press [EXIT] to start over (at step 1).

4. Unlock and remove the master device.

5. Press [EXIT] to return to the top-level menu.

6. For programming from RAM select **Copy From RAM.**

   If the devices to be programmed do not have the same ID as the original (master) device, select the manufacturer name for the devices (for example, AMD or Intel), then select the device from the list.

Note: For device specific information, refer to the **Device List** *(see "Device Support" on page 3-1 for more information).*

The PSX displays

```
INSERT DEVICES
ENTER TO COPY
```

The second line of the display blinks.

Note: For non-DIP devices, if the rail dial is turned to the CLOSED position, the PSX displays `ENTER TO COPY` *instead of* `CLOSE DIAL TO COPY`.

7. Insert the device(s) to be programmed into the module sockets (see "Installing Devices" on page 3-4). Insert the device(s) starting with socket 1. Make sure the devices are locked in.

8. Press [ENTER] to program devices.

   As the devices are programmed, the display is updated. The action symbol on the first line of the display indicates that the operation is in progress. The bars on the second line of the display advance to the right, indicating the percentage of the operation that is complete.

   The PSX displays

```
TESTING DEVICES *
```

```
PROGRAMMING DEVICES *
0% ——— 100%
```

```
VERIFYING DEVICES *
```

When programming is complete, the LED below each socket that contains a device illuminates. (See page 3-17 for a description of what the colors represent.) If a light does not illuminate below a socket that contains a device, the device might not be seated and locked in the socket properly.

If the devices programmed successfully, the PSX displays

```
COPY COMPLETE - OKAY
CHECKSUM=XXXX
```

where *XXXX* represents the hexadecimal checksum of the data copied into the devices. (You can select the number of digits used in the checksum from the Set Device Options menu; see Chapter 4, "Commands," for instructions on changing the checksum display width.)

If the devices did not program successfully, the PSX displays

```
COPY COMPLETE - ERRORS
```

and ERRORS is blinking.

Use the arrow keys to scroll through the list of encountered errors. As you scroll through the errors, the LED status indicators light up yellow when the error currently displayed on the front panel occurred in the device in that socket.

If none of the devices programmed and verified successfully, the PSX displays asterisks in place of the checksum.

9. Remove the programmed devices.

10. To repeat the programming operation for the same device type using the same RAM data, press [EXIT] and repeat steps 6 through 9.

11. After completing each job, record and clear programming statistics as described starting on page 4-40.

You have now completed the tutorial.

To go to a new operation, press [EXIT]. If you encountered problems, see "7. Troubleshooting" on page 3-16.

Load from and Copy from Set

To load data from a set of master devices into RAM, select **Load from Set.** to program device(s) using the data in RAM, select **Copy from Set.**

1. Scroll through the PSX menus and select **Load from Set**. The selected manufacturer and device appear on the second line of the display. If no device is selected, `AUTO DEVICE SELECT` is displayed.

Manually select the manufacturer name for the device (for example, AMD or Intel), then select the device from the list. When the correct manufacturer and device appear in the display, press [ENTER] .

If you encounter problems, you might need to disable Electronic ID from the **Set Device Options** menu (see page 4-18). For information on electronic ID see page 3-15.

2. For **Load From Set** (and other set operations), the top line displays the current **setsize** and **bitsize**. Make sure these options are set correctly (the setsize should equal the number of devices in the set, and the bitsize should equal the bitsize of each device). For more information on setsize and bitsize, refer to page 4-27.

For a single master device, the setsize should equal 1 (one).

To change the setsize or bitsize, press [EXIT] , and use the arrow keys until the **Set Operation Options** menu is displayed. Press [ENTER] to select the menu. When the setting is correct, press [EXIT] and use the arrow keys to return to the **Load From Set** menu. Press [ENTER] to select the menu.

3. The PSX displays

```
INSERT DEVICES
ENTER TO LOAD
```

Note: The PSX might display `ENTER TO LOAD` *instead of* `CLOSE DIAL TO LOAD`.

Install the device or set of devices you wish to load data from. See pages 3-3 and 3-4 for instructions on how to install devices.

CAUTION: Devices are static sensitive. Operate the PSX at an antistatic workstation. To avoid electric shock and damage to the devices, use an antistatic wrist strap containing a 1 M Ω (minimum) to 10 M Ω (maximum) isolating resistor.

For a **set of devices** or a single **non-DIP** device, install the first device in socket 1 of the left module. Install additional devices sequentially from left to right until the top rail is full, then sequentially from left to right on the bottom rail. Make sure that the devices are locked in (turn the dial to the start position) before you proceed.

4. After you have installed the master device(s), press [ENTER] to begin the operation.

   The PSX displays

   ```
   LOADING FROM SET *
   ```

   The action symbol (*) indicates that the operation is in progress. When the operation is complete, the PSX displays

   ```
   LOAD COMPLETE - OKAY
   CHECKSUM=XXXX
   ```

   where *XXXX* represents the checksum of the loaded data (see "Verifying Data Transfer (Checksum)" on page 3-17 for a description of checksum).

   If an error occurs during the operation, the PSX stops the operation and displays a message. Correct the situation and press [ENTER] to try again, or press [EXIT] to start over (at step 1).

5. Unlock and remove the master device(s). (For a set of DIP devices, turn the dial to the OPEN position.)

6. Press [EXIT] to return to the top-level menu.

7. For programming from a set of master devices, select **Copy From Set**, or for programming from a single master device, select **Copy from RAM**.

   If the devices to be programmed do not have the same ID as the original (master) device(s), select the manufacturer for the devices (for example, AMD or Intel), then select the device from the list.

8. Insert the device(s) to be programmed into the module sockets (see "Installing Devices" on page 3-4). Insert the device(s) starting with socket 1. Make sure the devices are locked in.

   For a set of devices, install additional devices sequentially from left to right until the top rail is full, then sequentially from left to right on the bottom rail. Make sure that the devices are locked in before proceeding.

9. Press [ENTER] to program devices.

   As the devices are programmed, the display is updated. The action symbol on the first line of the display indicates that the operation is in progress. The bars on the second line of the display advance to the right, indicating the percentage of the operation that is complete.

   The PSX displays

   ```
   TESTING DEVICES *
   ```

   ```
   PROGRAMMING DEVICES *
   0% ——— 100%
   ```

   ```
   VERIFYING DEVICES *
   ```

When programming is complete, the LED below each socket that contains a device illuminates. (See page 3-17 for a description of what the colors represent.) If a light does not illuminate below a socket that contains a device, the device might not be seated and locked in the socket properly.

If the devices programmed successfully, the PSX displays

```
COPY COMPLETE - OKAY
CHECKSUM=XXXX
```

where *XXXX* represents the hexadecimal checksum of the data copied into the devices. (You can select the number of digits used in the checksum from the Set Device Options menu; see Chapter 4, "Commands," for instructions on changing the checksum display width.)

If the devices did not program successfully, the PSX displays

```
COPY COMPLETE - ERRORS
```

and ERRORS is blinking.

Use the arrow keys to scroll through the list of encountered errors. As you scroll through the errors, the LED status indicators light up yellow when the error currently displayed on the front panel occurred in the device in that socket.

If none of the devices programmed and verified successfully, the PSX displays asterisks in place of the checksum.

10. Remove the programmed devices.

11. To repeat the programming operation for the same device type using the same RAM data, press [EXIT] and repeat steps 8 through 10.

12. After completing each job, record and clear programming statistics as described starting on page 4-40.

You have now completed the tutorial.

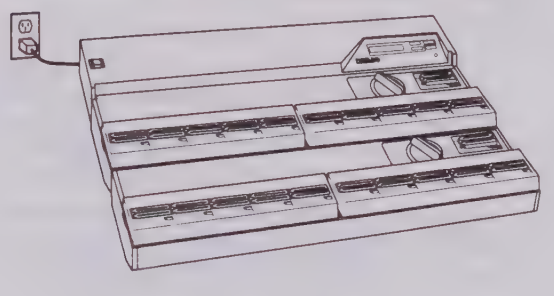
To go to a new operation, press [EXIT] . If you encountered problems, see "7. Troubleshooting" on page 3-16.

2 Setup

This chapter describes how to set up the PSX. The procedures referred to in the illustrations below are described on the following pages.

The PSX can be set up in the following three configurations:

A Local Mode

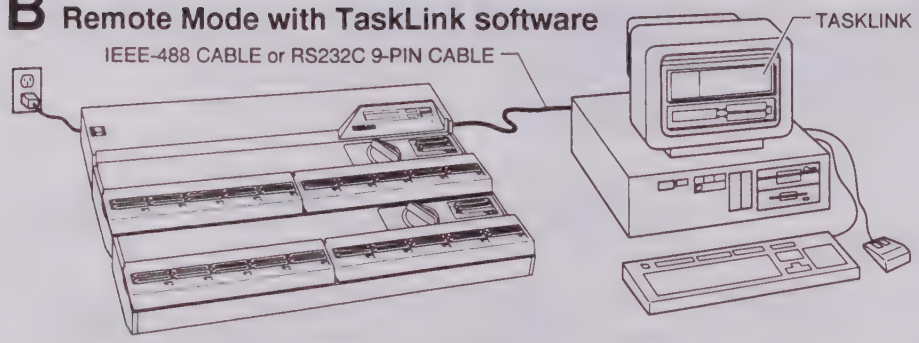


To set up:

- Install rails
- Install socket module (memory rail only)
- Connect power cord
- Turn on the power
- Refer to Chapter 3, "Operation", or Chapter 1, "Getting Started"

2360-1

B Remote Mode with TaskLink software

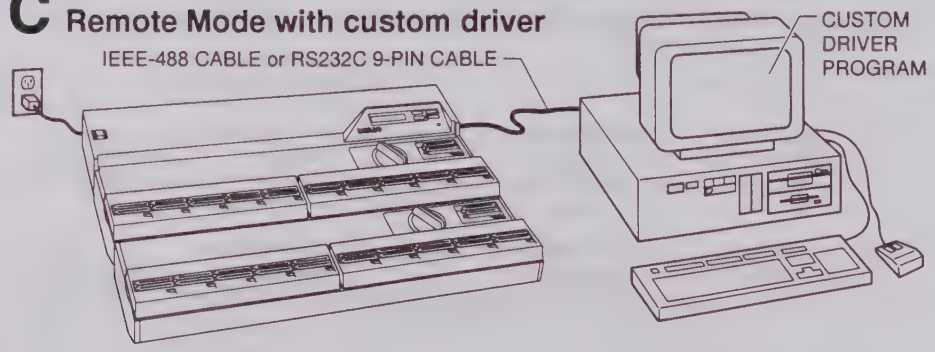


To set up:

- Install rails
- Install socket module (memory rail only)
- Connect power cord
- Connect IEEE-488 or RS232 cable
- Install TaskLink software and set up PSX in remote mode (TaskLink documentation)
- Turn on the power
- Refer to Chapter 3, "Operation"

2361-1

C Remote Mode with custom driver



To set up:

- Install rails
- Install socket module (memory rail only)
- Connect power cord
- Connect IEEE-488 or RS232 cable
- Refer to the "Computer Remote Control Operation" App Note
- Turn on the power
- Refer to Chapter 3, "Operation"

2362-1

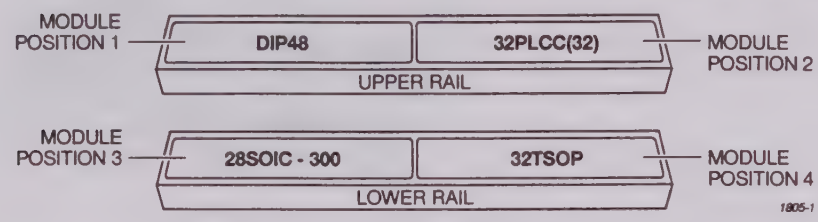
Supported Socket Module Arrangements

CAUTION: Installing socket modules when power is applied to the programmer can damage the programmer, rails, and socket modules and voids the warranty.

A Memory rail must have two socket modules installed in it **before you power up** the programmer. When installing socket modules, keep the following rules in mind:

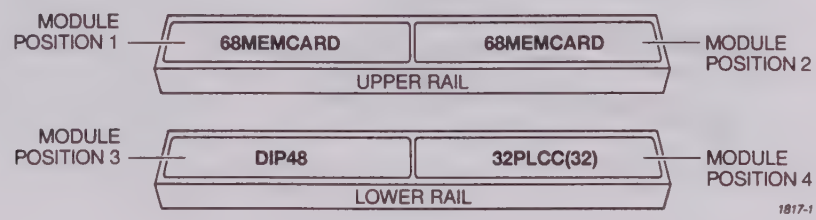
Installing Four Different Socket Modules

When you install four different socket modules (except for the 68MEMCARD socket module and the Micro modules), the socket modules may be in any of the four positions (see illustration below).



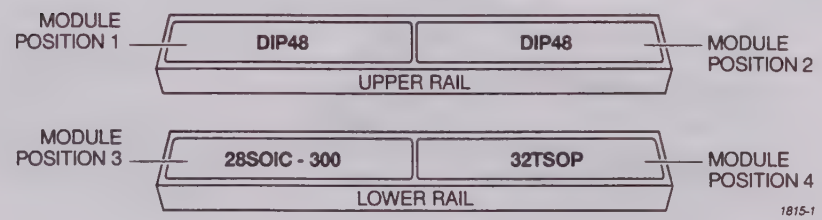
Installing 68MEMCARD Socket Modules and Micro Socket Modules

CAUTION: The 68MEMCARD socket module and Micro modules **must always be used in pairs.** For instance, when one of the socket modules is a 68MEMCARD socket module, both of the socket modules attached to a Memory rail must be 68MEMCARD socket modules (see illustration below).



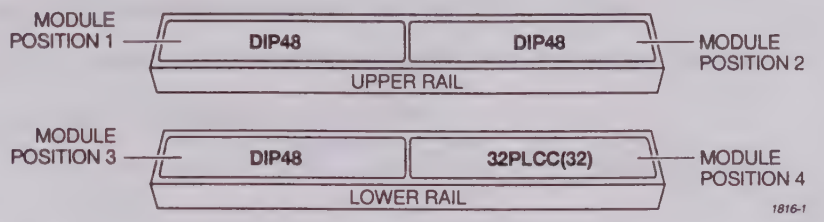
Installing Two Identical Socket Modules

When you install two identical socket modules, they must both be attached to the **same** rail, preferably the **upper** rail (see illustration below).



Installing Three Identical Socket Modules

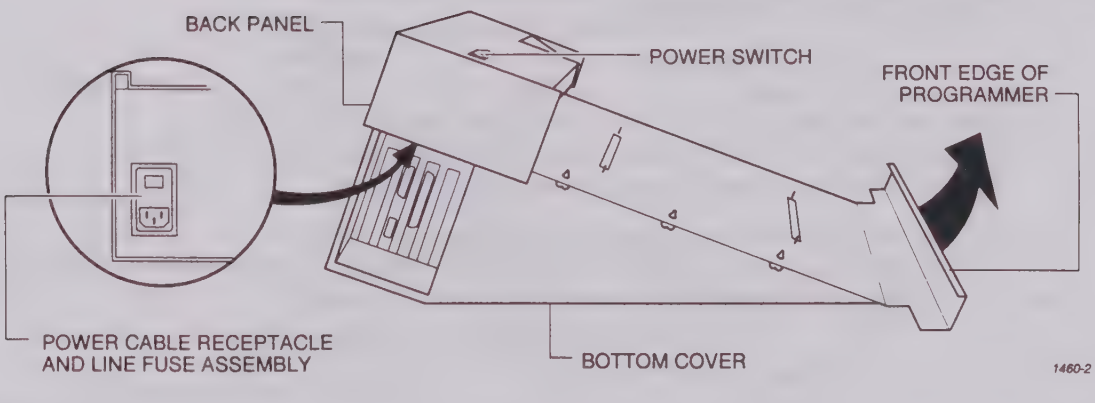
When you install three identical socket modules, install the first two in the upper Memory rail and the third in the left position of the lower rail (see illustration below).



Connecting the Power Cord

The PSX is shipped with a three-wire power cord. Connect the power cord to the receptacle located on the underside of the control module directly underneath the power switch (see the illustration below). Connect the other end of the cord to an ac power outlet. The three-wire power cord connects the programmer chassis to the earth ground when the cord is connected to a three-wire (grounded) power outlet.

WARNING: Continuity of the grounding circuit is vital for the safe operation of the unit. Never operate this equipment with the grounding conductor disconnected.

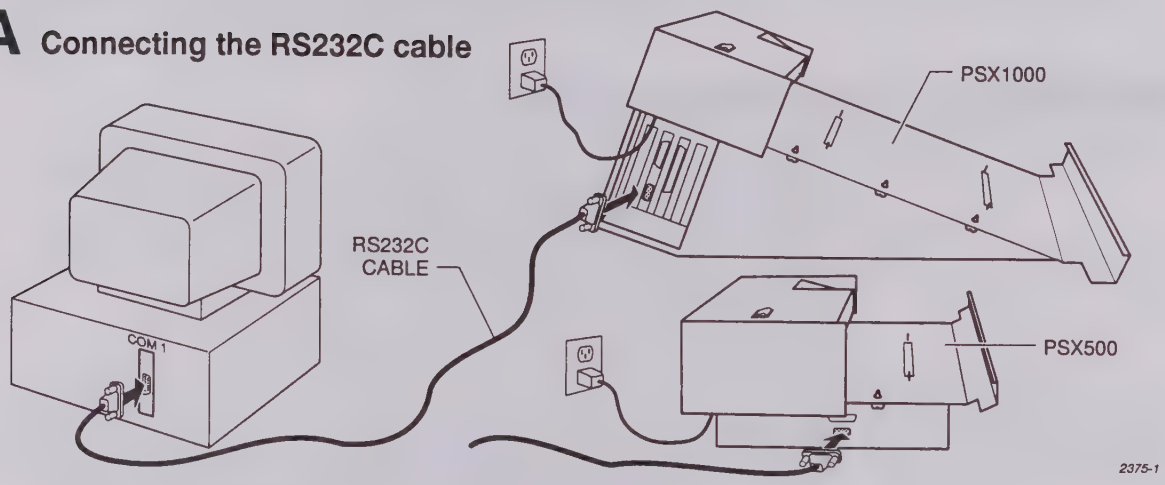


Connecting I/O Port Cable (Optional)

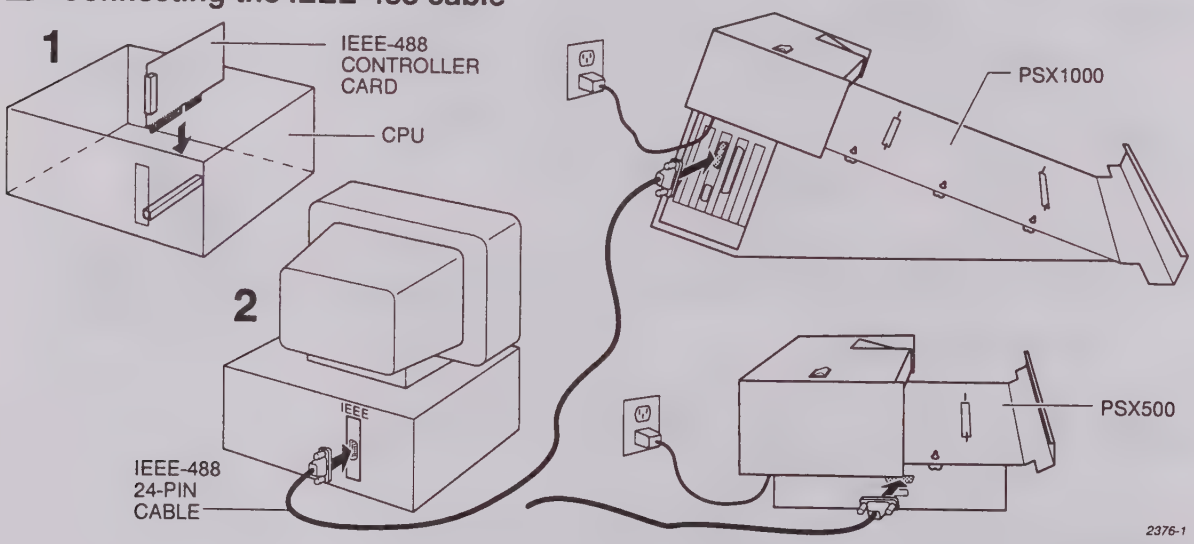
Complete step **A** (for RS232C connection) or step **B** (for IEEE-488 connection) in this section if you intend to do any of the following:

- Upload or download data from a host computer.
- Operate the programmer using TaskLink software.
- Operate the programmer using computer remote control (CRC) commands.

A Connecting the RS232C cable

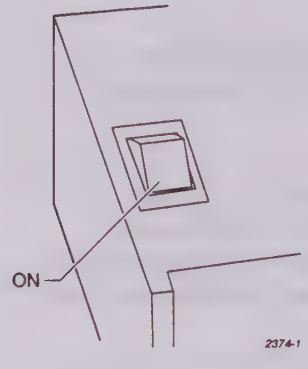


B Connecting the IEEE-488 cable



Note: IEEE-488 support is an available option for the PSX. For more information on using and installing IEEE-488 interfaces, see Appendix B, "Using an IEEE-488 Interface."

Turn On the Power



Follow the steps below to turn on the power.

1. Check that the PSX is ready by making sure that:
   - A socket module is installed (with all the sockets empty).
   - The power cord is connected.
   - The appropriate cable is connected (if you will use remote mode).
2. Press the power switch to turn on the PSX.
3. For several seconds, the PSX displays

   ```
   PSXYYYY N.NN
   ```

   where PSX*YYYY* is the model number and *N.NN* is the version of the installed software.
4. The PSX initializes and performs a system test (which should last less than a minute).
5. If the system test completes successfully, the PSX displays

   ```
   COPY FROM MASTER
   ^ OR v SCROLLS MENU
   ```

   If the programmer displays a message, see Chapter 6, "Messages," for an explanation.

   If the system powers up but nothing is visible on the display, turn the display adjustment dial (see page 3-2) until the text is visible.

Note: Using a Memory rail in the lower rail position when the rail in the upper rail position is **not** *a Memory rail generates a message, and the powerup cycle does not complete.*

The PSX is now ready for operation. For information about the operation features of the PSX programmers, see Chapter 3, "Operation." Refer to Chapter 1, "Getting Started" for a tutorial of how to use the PSX in local mode.

Backwards Compatibility

During powerup, the PSX display shows the current system configuration:

```
PSXYYYY N.NN
```

where *YYYY* is 500 or 1000 and *NN.N* is the version of the installed software. For example, `PSX1000 3.40` represents a version 3.40 system configuration.

Supported Software Versions

Each socket module requires a specific version of software. To identify which socket modules are supported on your control module, compare the version of your firmware with those listed in Table 2-1. For more information, see "View Configuration" on page 4-51.

Note: Using socket modules with versions earlier than the one specified in Table 2-1 causes the module to malfunction.

Table 2-1
Software Versions Supported by Socket Modules

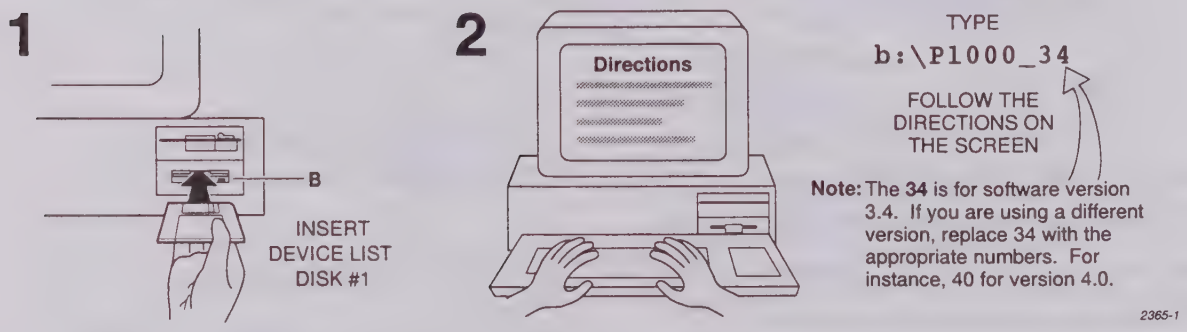
Socket Modules	Version
DIP48	All
32PLCC(28)	2.0 and higher
32PLCC(28)HT	3.0 and higher
32PLCC(32)	2.0 and higher
32PLCC(32)HT	3.0 and higher
44PLCC	2.0 and higher
44PLCCHT	3.0 and higher
68MEMCARD	2.1 and higher
28SOIC-300	2.1 and higher
28SOIC-330	2.1 and higher
32SOIC-440	3.0 and higher
40SOIC-450	3.0 and higher
44SOIC-530	3.4 and higher
28TSOP	3.2 and higher
32TSOP	3.0 and higher
40TSOP	3.22 and higher
48TSOP	3.4 and higher
56TSOP	3.4 and higher
MICRO-DIP48	3.22 and higher
MICRO-44PLCC	3.22 and higher
MICRO-52PLCC	3.4 and higher
MICRO-64QFP	3.4 and higher

3 Operation

This chapter describes PSX features used during operation (such as the scrolling menus and LED indicators), device selection procedures, and some common parallel programmer operations.

Device Support

You can view a list of devices supported by the PSX by running the **P1000_*nn*** program (where *nn* is the version number; for instance 40 for version 4.0, 41 for version 4.1) located on the **Device List** disk. The Device List requires a DOS PC with a high-density 3.5-inch floppy drive. The Device List also contains information about these devices, which includes manufacturer, bitsize, the presence of electronic ID (see page 3-15), device type, and the socket module required for each device.



To view the Device List, do the following:

With the Device List, you can generate custom device lists, locate a list of specific devices and optionally print that list or save it to a file. Also, the data in the Device List is formatted to make importing it into a database or spreadsheet easy.

For more information, see the **readme.txt** file, which is included with the Device List.

Customizing the Device List

The **Select Device List** option under the **Set Device Options** menu (see page 4-18) allows you to select the ten devices that you use most frequently and have them appear at the top of the Device List for quick access. The Select Device List devices are identified by an asterisk (*) on the left.

Using the Display, Keyboard, and Menus

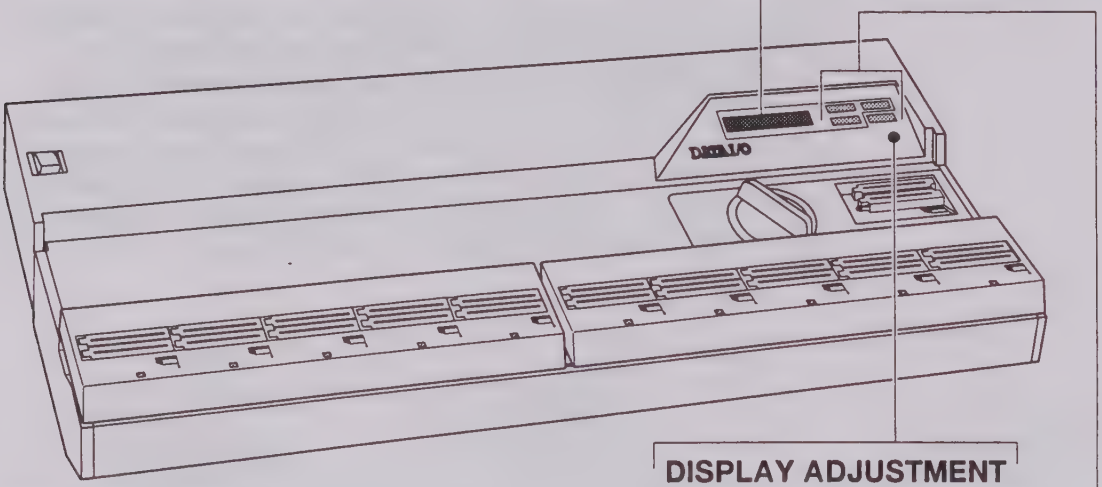
The PSX's display, keyboard and scrolling menus are described in the illustration.

DISPLAY

ACTION SYMBOL — A circle with a rotating line that appears while the programmer is processing devices, represented in this manual by an asterisk (★).

When the PSX is not processing devices or running an application, you can access the scrolling menus.

During programming, bars advance to the right indicating what percentage of the operation is complete.



DISPLAY ADJUSTMENT

To adjust the display, turn the adjustment dial.

SCROLLING MENUS

Enter programming commands, device specifications, and operating parameter values using the scrolling menus.

The scrolling menus operate like a moving window on a list (menu) of options. Press an arrow key once to move the window up or down the list. Hold down an arrow key to quickly scroll through the menu.

PSX has several levels of menus (see page 4-2). The top-level menus are displayed after powerup and you can scroll through them in either direction by using the [∧] or [∨] key. When you select a menu (by pressing [ENTER]), a submenu may become available.

If the top-level menu entered is a device-related operation (such as Load From Master), you must select a manufacturer and device.

If the module installed on the PSX supports more than one package, you also must select a package.

KEYS

[∧]	[∨]	[ENTER]	[EXIT]
Scrolls to the menu item above the displayed item, or increases a parameter value.	Scrolls to the menu item below the displayed item, or decreases a parameter value.	Enters the displayed menu, or runs the menu selection.	Exits the currently selected menu, or discontinues an operation.

2373-1

Installing a Device in the Master Socket

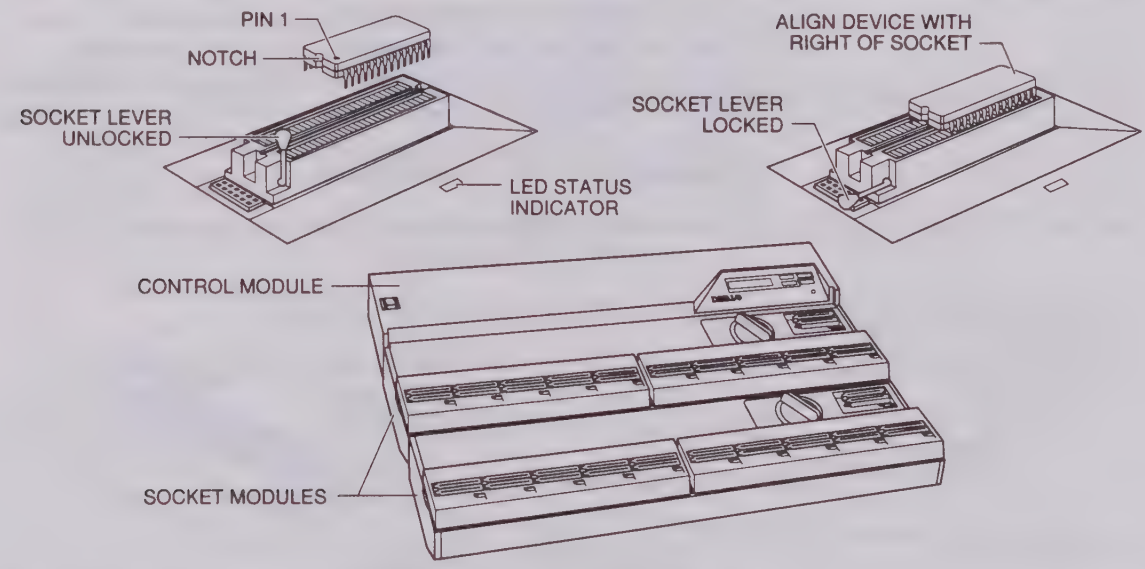
The illustration below shows how to install a DIP device or a Master Socket adapter (see page xv) into the master socket.

CAUTION: ***Devices are static sensitive. Operate the PSX at an antistatic workstation. To avoid electric shock and damage to the devices, use an antistatic wrist strap containing a 1 MΩ (minimum) to 10 MΩ (maximum) isolating resistor.***

MASTER DIP SOCKETS

1 Make sure the lever is in the unlocked position. The device should align with the right of the socket. The notch should face the left.

2 Place device in the socket. Move the lever forward into the locked position.

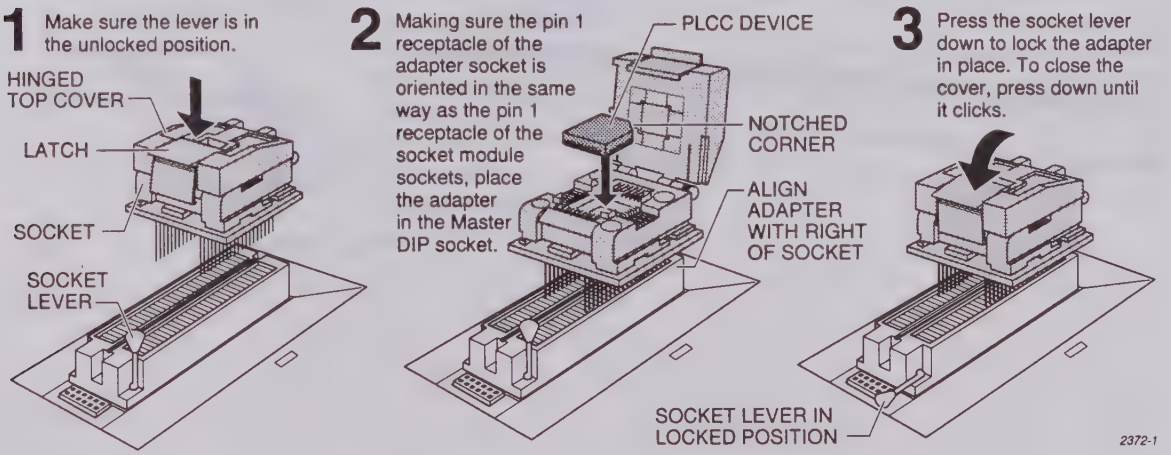


MASTER SOCKET ADAPTERS (PLCC adapter shown)

1 Make sure the lever is in the unlocked position.

2 Making sure the pin 1 receptacle of the adapter socket is oriented in the same way as the pin 1 receptacle of the socket module sockets, place the adapter in the Master DIP socket.

3 Press the socket lever down to lock the adapter in place. To close the cover, press down until it clicks.



Note: If two identical rails are installed on a PSX1000, you can insert the Master Socket adapter into either master DIP socket.

Installing Devices in Rail Sockets

This section includes the following device installation and removal instructions:

DIP Devices 3-5

PLCC Devices 3-7

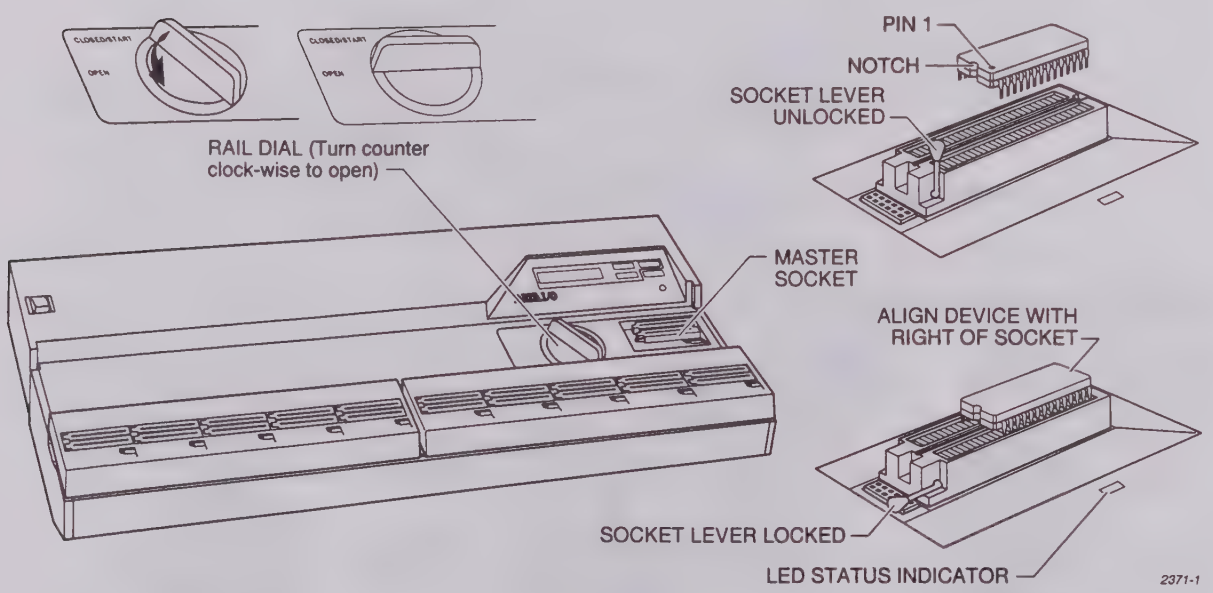
SOIC, TSOP, and QFP Devices 3-9

Memory Cards 3-11

CAUTION: Devices are static sensitive. Operate the PSX at an antistatic workstation. To avoid electric shock and damage to the devices, use an antistatic wrist strap containing a 1 MΩ (minimum) to 10 MΩ (maximum) isolating resistor.

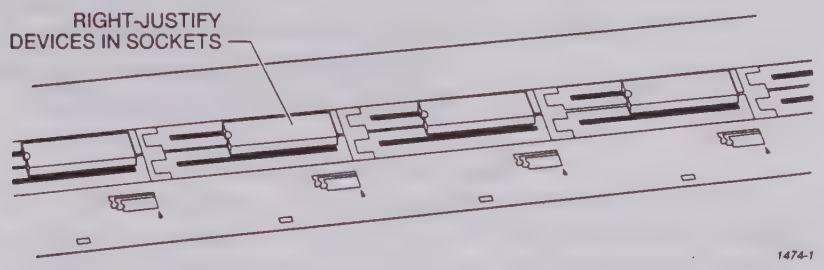
Note: When you program sets, devices must be loaded sequentially, starting at the far left socket of the upper left socket module or upper rail. When the setsize is greater than the capacity of a single rail (10 or 15, depending on the rail type), all socket modules and rail types must be identical.

The illustration below shows how to open and close the rail dial.



DIP Devices

When placing a DIP device in a socket module socket, master socket, or rail socket, make sure pin 1 (represented by the notch at one end of the device) is to the left and the device is right-justified in the socket.



You can manually place devices in sockets or use the rail tool to place devices in sockets.

Installing Devices Manually

To insert devices manually, perform the following steps:

Inserting Devices

1. Turn the dial to the open position.
2. With the notched end to the left, place the device all the way to the right in the socket.
3. Turn the dial to the closed/start position to process devices.

Removing Devices

To remove devices manually, perform the following steps:

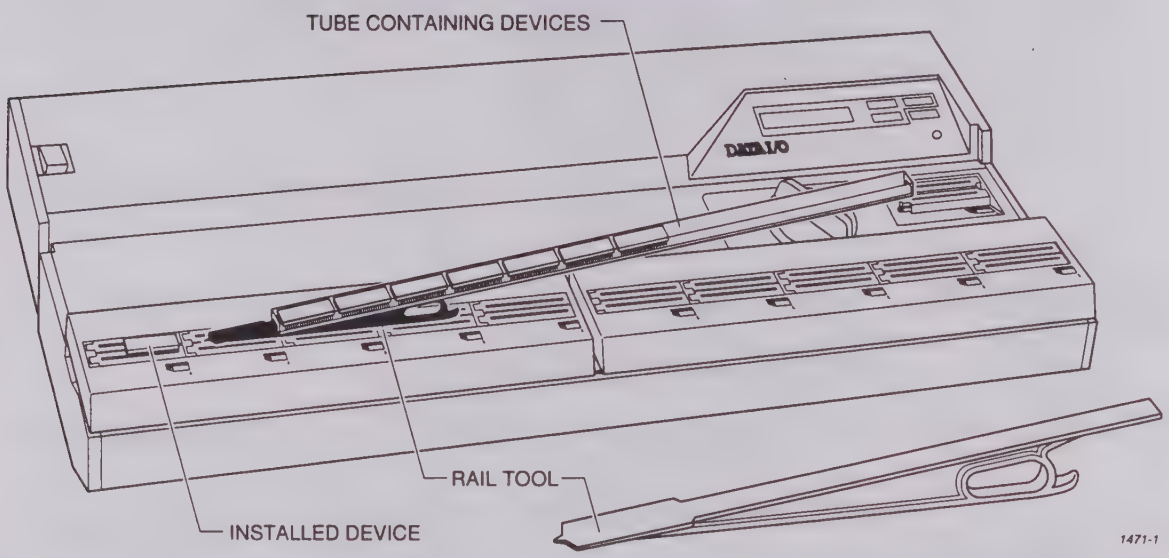
1. Turn the dial to the open position.
2. Remove the devices from the sockets.

Installing Devices Using the Rail Tool

Included with your programmer is a rail tool for use with DIP devices. The rail tool allows you to insert and remove these devices quickly and easily.

Inserting Devices

1. Turn the dial to the open position.
2. Open a device tube.
3. Place the device tube on top of the rail tool so that the pointed end (wide portion) of the rail tool extends beyond the open end of the tube, and so that the handle extends down below the tube (see the illustration below).



4. Place the point of the rail tool in the groove in the center of the rail sockets, and use the point of the rail tool to guide the devices out of the tube and into the sockets. Make sure that pin 1 of the device (usually indicated by a notch) is to the left and that the device is inserted all the way to the right in the socket.
5. Turn the dial to the closed/start position to process devices.

Removing Devices

You can manually remove devices from sockets or use the rail tool to remove devices from sockets as follows:

1. Turn the dial to the open position.
2. Position an empty tube on the rail tool so that the pointed end (wide portion) of the rail tool extends beyond the open end of the tube, and the handle extends down below the tube.
3. Starting with the point of the tool at one end of the rail, scoop the devices up into the tube by running the point of the rail tool down the groove in the middle of the rail sockets.

PLCC Devices

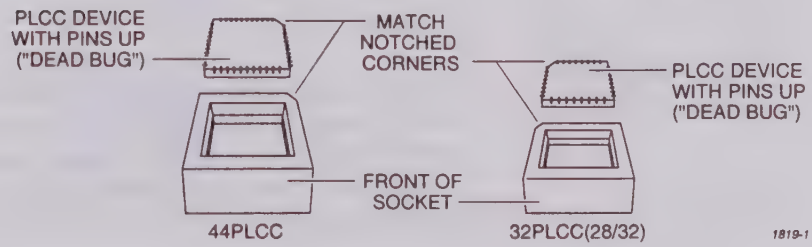
Push/Pop Sockets

When placing a PLCC device in a PLCC push/pop socket module socket or PLCC push/pop master socket adapter refer to the illustrations below, and keep the following things in mind:

- Turn the device over so the **pins are up** ("dead bug")
- Make sure pin 1 (represented by the notched corner of the device) is in the same corner as the notched corner of the socket as stated below:

Inserting Devices

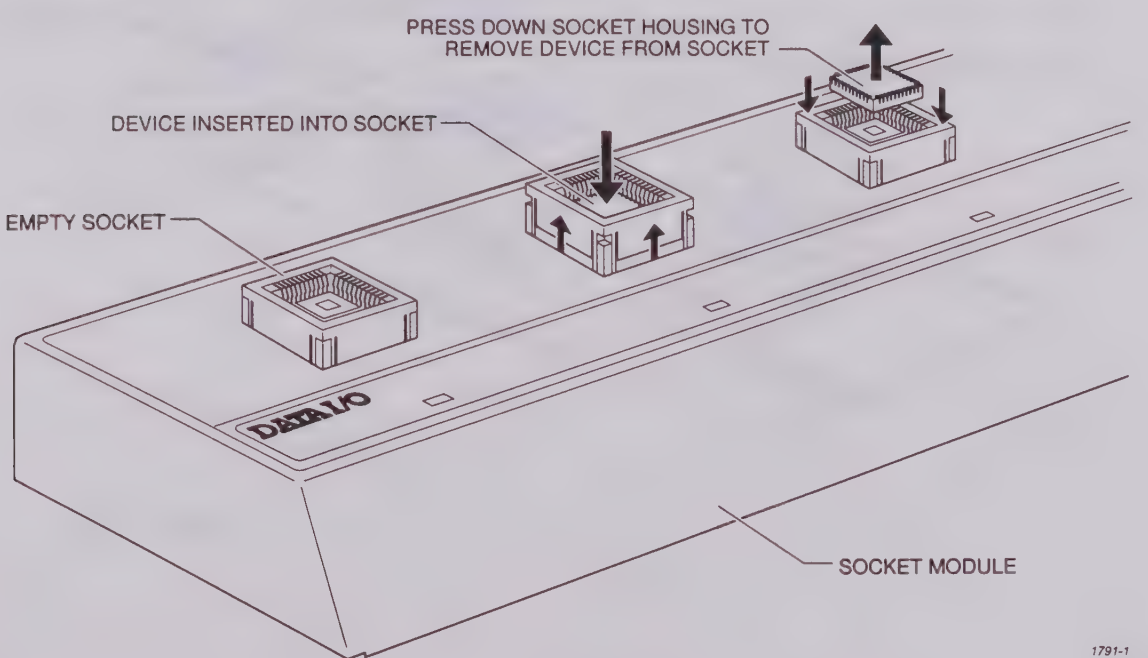
1. Orient the device so that the notched corner on the device is in the same corner as the notched corner on the socket, and drop the PLCC device into the socket (see the illustration below).



2. Press gently on the bottom of the device until it is fully seated in the socket.

Removing Devices

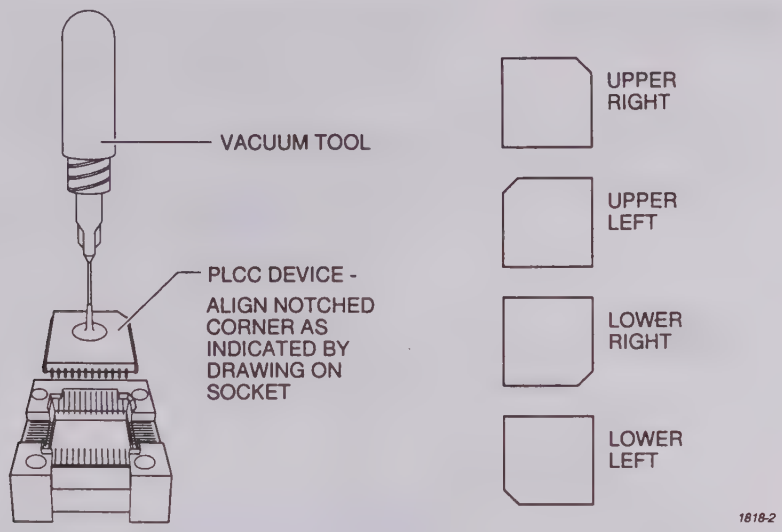
Using even pressure, press down on the socket housing (outside edge) of the socket until the device pops out of the socket.



Hinged-Top Sockets

When placing a PLCC device in a PLCC hinged-top socket module socket or PLCC hinged-top master socket adapter refer to the illustrations on this page.

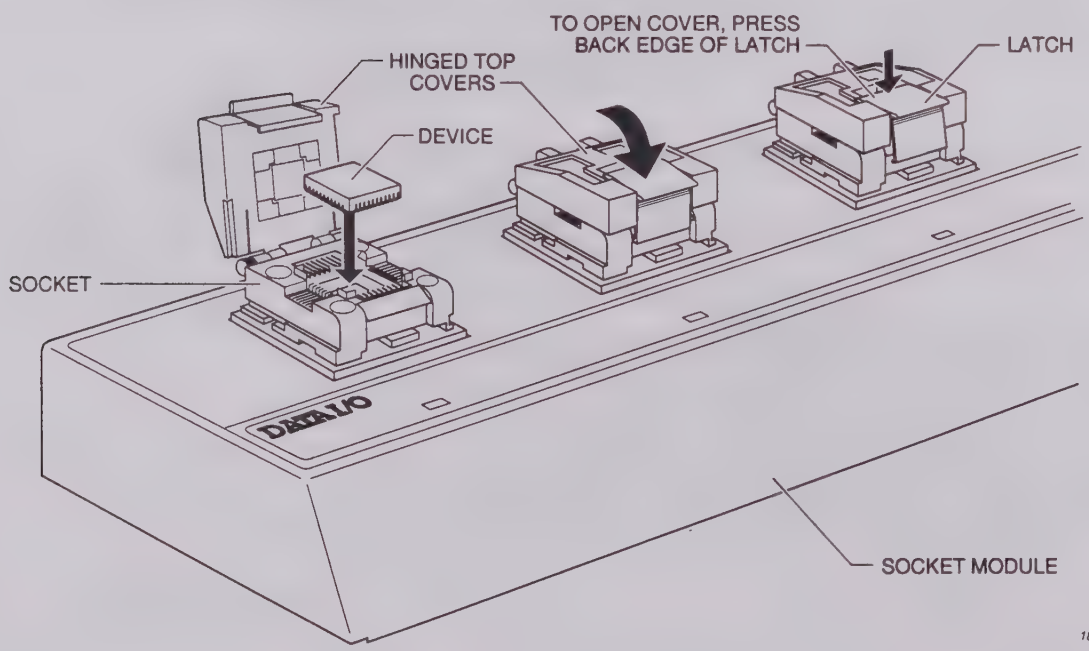
Inserting Devices



1. Using a vacuum tool, pick up a PLCC device with the pins down, orient the device so that the notched corner on the device is aligned with the corner indicated by the drawing next to the socket, and place the device in the socket (see illustration above).
2. Close the cover to secure the device in the socket.

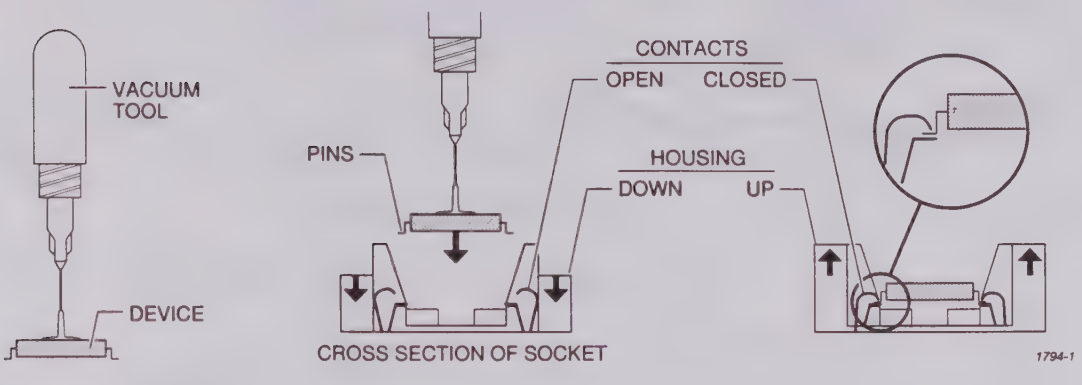
Removing Devices

1. Press gently on the back edge of the cover latch to release the cover.
2. Using a vacuum tool, pick up the PLCC device.



SOIC, TSOP, and QFP Devices

When placing an SOIC, TSOP, or QFP device in a socket module socket or master socket adapter, use a vacuum tool (as shown in the illustration below) and make sure pin 1 (represented by the notch or the circle indented into the package at one end of the device) is to the left on SOIC sockets (see the illustration on the next page) and to the back (away from the LEDs) on TSOP sockets (see the device manufacturer's data book for the device pinout). For QFP sockets make sure pin 1 (usually represented by a dot on the device) is in the lower left corner.



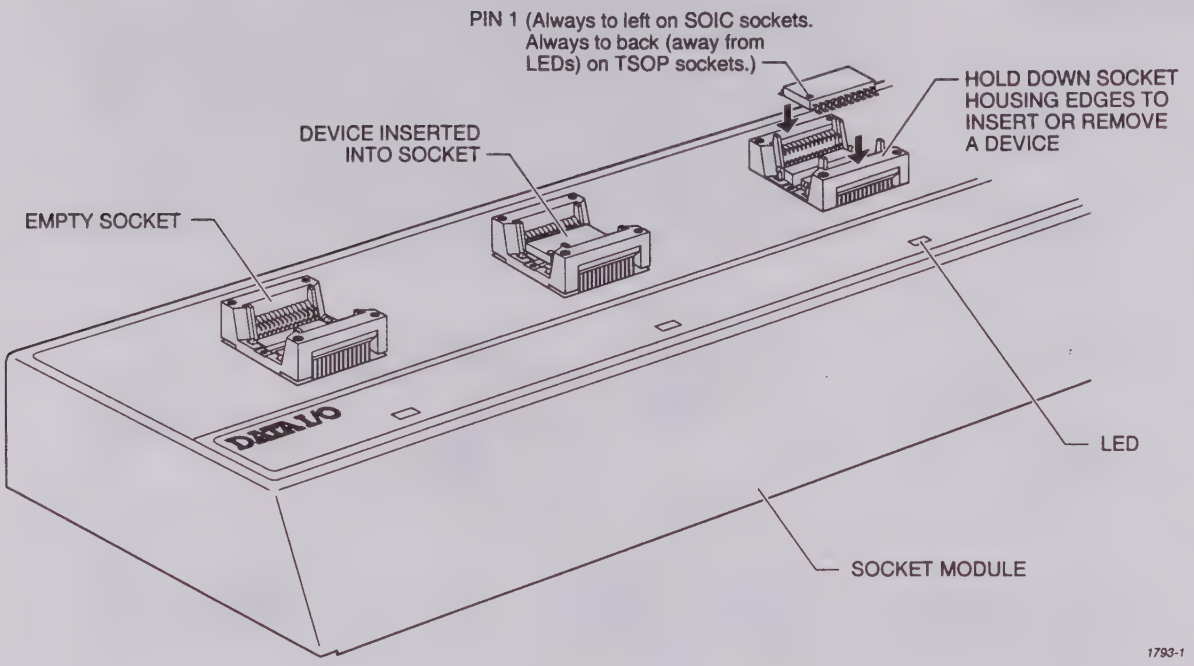
Inserting Devices

1. Press and hold down the socket housing (ends) of the socket.
2. Using the vacuum tool, pick up an SOIC or TSOP device.
3. With the notch or indented circle to the left for an SOIC, to the back (away from the LEDs) for a TSOP, and in the lower left for a QFP, set the device in the socket.
4. Release the socket housing.

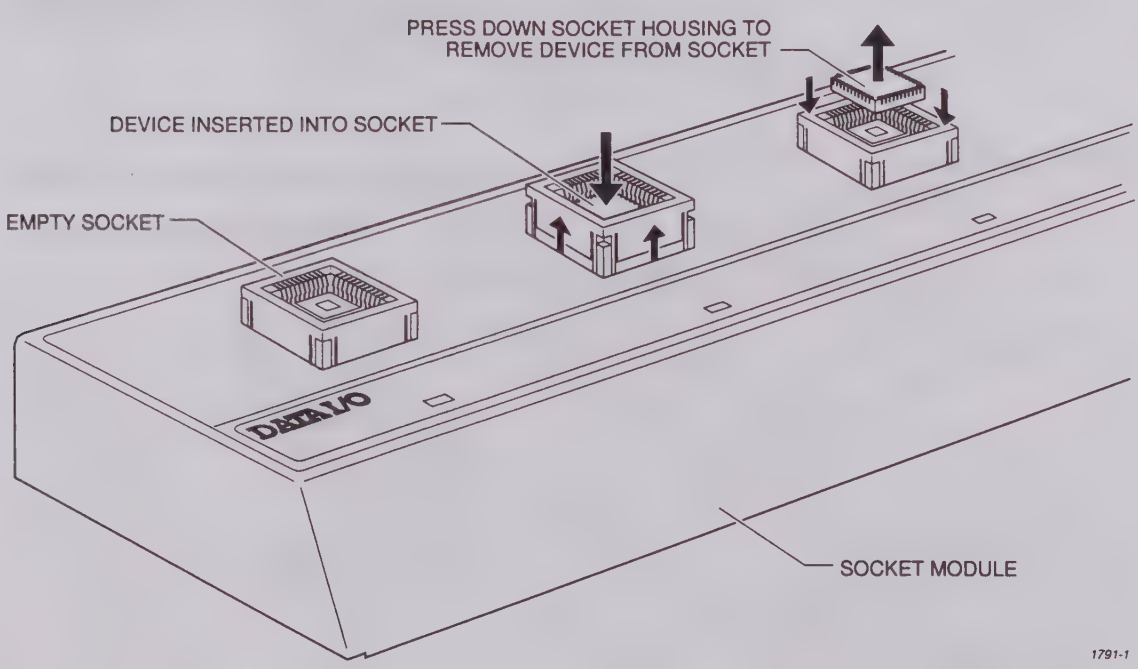
Removing Devices

1. Press and hold down the socket housing (ends) of the socket.
2. Using the vacuum tool, remove the device from the socket.
3. Release the socket housing.

The illustration below shows SOIC and TSOP sockets.


PIN 1 (Always to left on SOIC sockets. Always to back (away from LEDs) on TSOP sockets.)
HOLD DOWN SOCKET HOUSING EDGES TO INSERT OR REMOVE A DEVICE
DEVICE INSERTED INTO SOCKET
EMPTY SOCKET
LED
SOCKET MODULE
1793-1

The illustration below shows QFP sockets.



Memory Cards

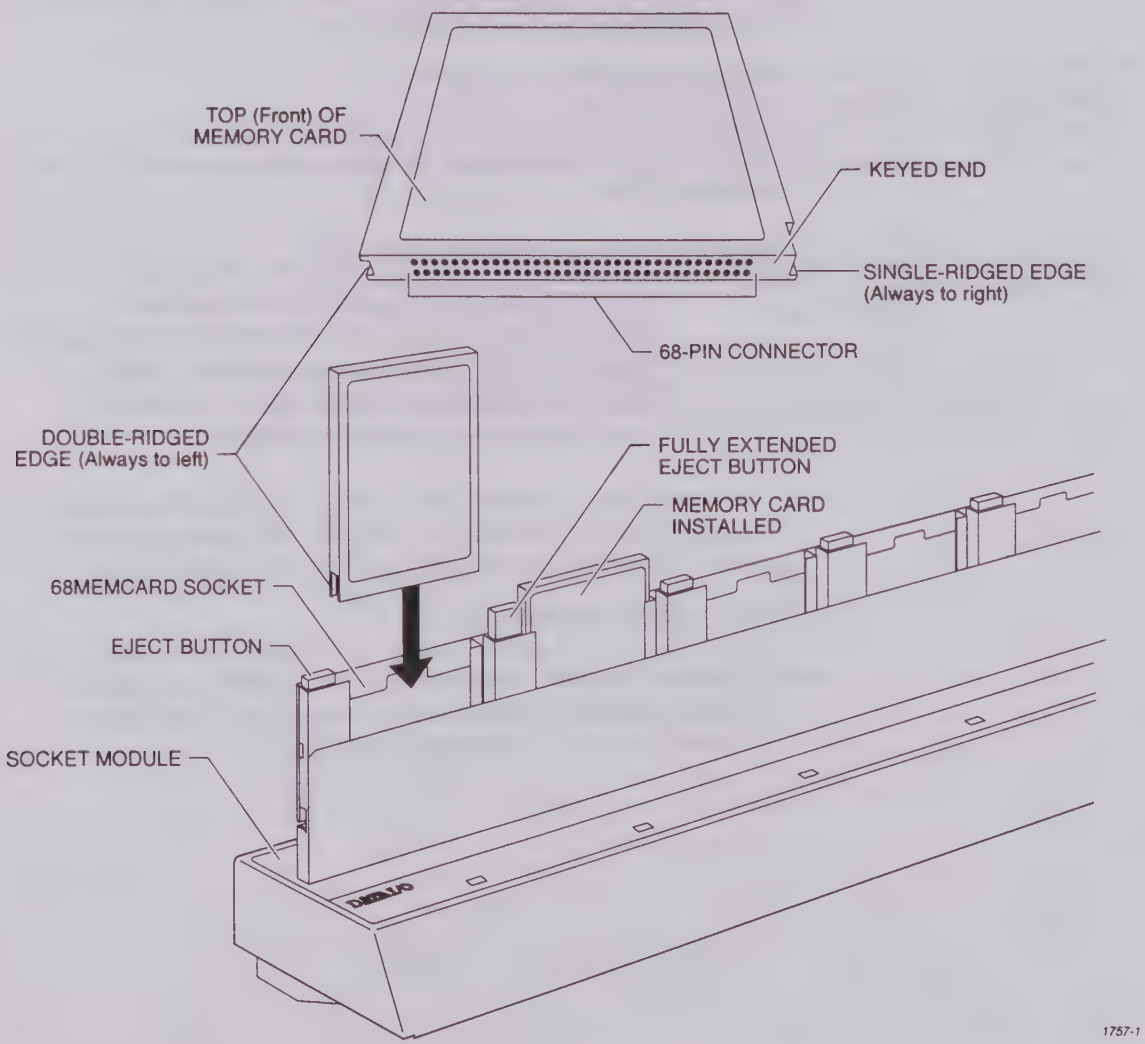
When placing memory cards in the 68MEMCARD socket module or 68MEMCARD master socket adapter, make sure the keyed end is toward the PCMCIA card sockets. The double-ridged edge should be to the left (the same side as the eject button); the single-ridged edge should be to the right (see the illustration below).

Inserting Devices

1. Place the card in the card socket.
2. Press the card straight down until it is seated in the card socket. When the memory card is properly inserted, the eject button is fully extended.

Removing Devices

1. Press down on the eject button to disconnect the memory card from the card socket.
2. Remove the memory card.



Operating the PSX in Local Mode

The following section describes how to operate the PSX in local mode (stand-alone configuration). See Chapter 1, "Getting Started," for a tutorial.

Note: For CRC (remote) operation using TaskLink, refer to Chapter 2, "Setup," to set up the PSX to operate with TaskLink, and see the TaskLink documentation for instructions on how to use TaskLink.

For CRC (remote) operation using your own drivers, refer to Chapter 2, "Setup," for instructions on how to set up the PSX to operate in CRC mode, and to the "Computer Remote Control" Application Note (see page 4-54).

1. Set Up the PSX

If the rail that supports the devices you will be using is not installed, set up your PSX as follows:

Note: Before proceeding, make sure all device sockets are empty and the rail dial is in the OPEN position.

1. Turn off the power to your PSX.
2. Install the rail that supports the devices you will be programming (see page 2-2 for instructions on installing and removing rails).

CAUTION: Do not remove or install rails or socket modules when power is applied to the programmer. Removing or installing rails when power is applied to the programmer can damage the programmer, rails, and socket modules, and voids the warranty.

3. If you installed a Memory rail, install the socket module(s) that supports the devices you will be programming (see page 2-5 for instructions on installing socket modules).
4. Turn on the power to your PSX.

Note: When the power is turned on, the PSX initiates a system test (which should take less than a minute). See "Turn On the Power" on page 2-9 for more information.

2. Install Devices for Load or Copy Operation

Install the master device or master set of devices from which you wish to load or copy data.

CAUTION: Devices are static sensitive. Operate the PSX at an antistatic workstation. To avoid electric shock and damage to the devices, use an antistatic wrist strap containing a 1 MΩ (minimum) to 10 MΩ (maximum) isolating resistor.

1. If you are using **one master device** as the source for your programming operation, do one of the following:
   - ♦ Install the DIP device in the **master socket** on your PSX.
   - ♦ If you are using **one non-DIP master device** as the source for your programming operation and do not have a master socket adapter, install the device into socket 1 of the left-most socket on the upper rail.
2. If you are using **multiple master devices** as the source for your programming operation, install devices starting with socket 1. Install additional devices sequentially from left to right until the top row is full, then sequentially from left to right on the bottom row.

See page 3-3 for instructions on how to install a master device in the master socket. See page 3-4 for instructions on how to install devices starting with socket 1 in the rail sockets.

Note: Make sure that the devices are locked in before proceeding. When the devices are locked, they cannot be removed from the sockets.

3. Set Device Parameters

Before you can program devices, you must set the correct device information.

When you set the device information (such as the device manufacturer, device type, and package type), your selections become the **default** choices for all device operations until the settings are changed. (*Default* means that if you do not change the value of a device option, the programmer uses the previously set value for that option. For a listing of the default values set at the factory, see page C-4.)

If the most recent settings are appropriate for the devices you wish to use, you do not need to change them. Skip to step 4, "Load Data From Master Device(s)" on the next page.

If you are unsure of the settings or you know you need to change them, change the device options by using either the method described under "Manual Select" (recommended) or "Auto Device Select."

Manual Select

Select the **Copy From Master** command (for a single master device in the master socket), select the **Load From Master** command (for a single master device in socket 1), or select the **Load From Set** command (for multiple master devices) from the PSX's menus. Select manufacturer, device, and package as described below:

- To select a different manufacturer, press either arrow key to scroll to the desired manufacturer (displayed in alphabetical order). To scroll through the list quickly, press and hold the arrow key. When the desired manufacturer appears in the display, press ENTER .
- To select a different device, press either arrow key to scroll to the desired device (displayed in alphabetical order). When the desired device appears in the display, press ENTER .

Auto Device Select

The Auto Device Select feature is supported only when you program, load, or verify devices that have an **electronic ID** feature. Refer to the **Device List** to find out which devices support the electronic ID feature (see "Device Support" on page 3-1 for more information).

To enable the programmer to automatically identify devices using the electronic ID (silicon signature) and select the correct device, from the **Set Device Options** menu choose the **Auto Device Select** command from the top of the list in the manufacturer menu.

Note: Auto Device Select is not recommended because of the possibility of duplicate electronic IDs existing on devices that do not use the same programming algorithm.

Electronic ID

To enable the programmer to verify that the selected device matches the electronic ID contained in the installed device, from the **Set Device Options** menu choose the **Electronic ID** command.

- If the Electronic ID option is **off**, the programmer uses it only when Auto Device Select is selected.
- If you select a device and Electronic ID is set to **On**, the IDs of the master (source device) and socketed devices must match that of the selected device before you can process devices.
- When electronic ID is set to **Warn**, the LEDs light yellow below any installed device that has a different electronic ID from the selected device. To program the mismatched device(s), press [ENTER]. To discontinue the operation, press [EXIT].

4. Load Data From Master Devices

If you inserted master device(s) into the rail sockets (you are **not** using the master socket), before you can program a device, data for the target device(s) must be loaded into the programmer's RAM. In local mode operation, do the following to load the data into programmer RAM from a master device or master set of devices:

Note: If you are copying data directly from a device installed in a master socket, you do not need to load data into RAM, skip to step 5, "Program Devices."

1. Use a load operation to load the data from the device into the programmer's RAM:
   - Select the **Load From Master** command (see page 4-12) to load data from the **master device** you inserted in the master socket (step 2, "Install Devices for Load or Copy Operation"). Note that this operation loads from a device inserted in the master socket.
   - Select the **Load From Set** command (see page 4-13) to load data from the **set of master devices** or a **single master** device you inserted in the rail sockets (step 2, "Install Devices for Load or Copy Operation"). Note that this operation loads from device(s) inserted in the rail sockets.
2. After you select the load operation by turning the dial(s) to the closed/start position (or by pressing [ENTER] if the dials are already in the closed/start position) the programmer begins loading the data.

   When the programmer has completed the load operation (the programmer displays the `Load complete - okay` message), remove the master device or set of devices from the rail sockets.

   After removing the devices, store them in a safe place.

5. Program Devices

To program the data into devices, do the following.

1. Install the device or devices you wish to program starting with socket 1. Install additional devices sequentially from left to right until the rail is full (upper rail on PSX1000), then sequentially from left to right on the lower rail (lower rail available on the PSX1000 only). (See page 3-4 for instructions on how to install devices.)

Note: When you program sets, devices must be loaded sequentially, starting at the far left of the upper left socket module or upper rail. When the setsize is greater than the capacity of a single rail (10 or 15 depending on the rail type), all socket modules and rail types must be identical.

2. Scroll through the PSX menus and select one of the following:

   - If you are copying directly from a master device to devices installed in the rails, select the **Copy From Master** command to program devices (see page 4-4).
   - If the **Load From Master** or **Load from Set** command was used to load data from a **single** master device, select **Copy From RAM** to program devices (see page 4-6).
   - If the **Load From Set** command was used to load data from a set of devices, select **Copy From Set** to program devices (see page 4-8).

Note: The PSX supports many more operations, including diagnostics and load through port. All available operations (commands) are described in Chapter 4, "Commands."

For a step-by-step example of how to program a device, refer to the tutorial in Chapter 1, "Getting Started."

6. Completing the Job

After completing each job, record and clear programming statistics as directed starting on page 4-40.

7. Troubleshooting

Discontinuing an Operation

To discontinue an operation in progress, press EXIT. The PSX displays a message. You can either restart the operation or proceed to a new one. You do not have to re-enter any values you entered for the operation.

Verifying Data Transfer (Checksum)

After performing a copy, load, or verify operation, the PSX displays a 4- or 8-digit hexadecimal checksum on the second line of the display. (You can select the number of digits used in the checksum from the Set Device Options menu.) For example, if you copy the device data from RAM to blank devices, at the end of the operation the PSX displays

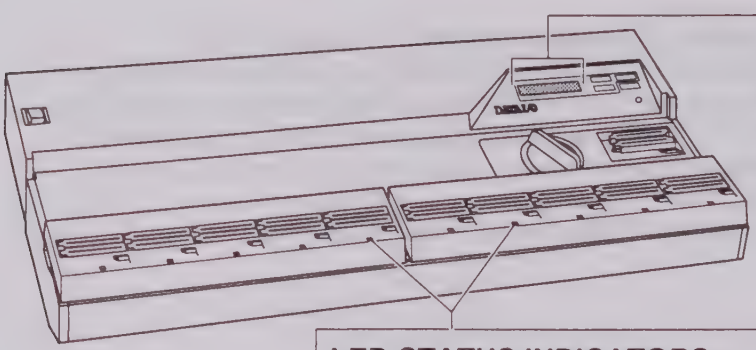
```
COPY COMPLETE - OKAY
CHECKSUM=XXXX
```

where *XXXX* is the 4- or 8-digit hexadecimal checksum.

If the checksum calculated after the operation matches the original checksum for the device(s), the data transfer was successful; otherwise, an error occured (see "Errors and Messages" on the next page for more information).

Reading LED Status Indicators

The illustration describes what the LED colors represent.



LED STATUS INDICATORS

Color	Indicates
Green	Devices successfully processed or device operation in progress
Red *	Empty socket, or device or socket module partially shorted, or devices not successfully processed
Yellow	Devices in which the error currently displayed on the front panel occurred

* *You can set the indicator light to OFF for empty sockets. (See page 4-30.)*

SCROLLING MENUS

You can review messages received during device-related operations after the operation is completed. When the programmer displays ERRORS ("Errors" will blink), the socket LEDs are green at sockets containing successfully processed devices and red at sockets containing devices that encountered errors. Use the arrow keys to scroll through the list of the encountered errors. As you scroll through the errors, the red LEDs turn yellow when the error currently displayed on the front panel occurred in the device in that socket. See the "Messages" chapter for an explanation of each message.

If none of the devices were programmed or verified successfully, the programmer displays asterisks in place of the checksum.

2370-1

Errors and Messages

Messages are displayed to notify you of status and problems.

For example, if the devices did not program successfully, the PSX displays

```
COPY COMPLETE - ERRORS
CHECKSUM=****
```

with ERRORS blinking.

Use the arrow keys to scroll through the list of encountered errors. As you scroll through the errors, the LED status indicators light up yellow when the error currently displayed on the front panel occurred in the device in that socket. If none of the devices programmed and verified successfully, the PSX displays **** (asterisks) in place of the checksum.

Refer to Chapter 6, "Messages," for a description of each message and suggested corrective action.

8. Turning Off the Power

Before turning off the power, make sure all device sockets are empty and in the unlocked position.

Powering Down Saves Defaults

All the operating parameter values you select (such as manufacturer, device, parity, or baud rate) are saved when you turn off the power and become the defaults until you change them. If the PSX is in computer remote control (CRC) when you turn it off, it automatically re-enters CRC when you turn it back on.

Note: For factory default settings see page C-4.

4 Commands

This chapter lists and describes the PSX commands (menu items) in alphabetical order and lists the translation formats supported by the PSX.

Command Summary

The PSX commands are accessed through a menu structure (shown in the diagrams on the next few pages). In the diagrams, top-level menus appear on the left, and the submenus, or options, available under each of the top-level menus are shown next to the menu name. Items appearing in boxes with dashed lines are available only when the PSX is set up for IEEE-488 operation. To use the menus, do the following:

- To display a menu item, scroll to it by pressing the arrow keys.
- To enter a specific menu (select the command), press ENTER .
- To leave a menu, press EXIT .

Note: To learn how to scroll through the PSX's menus, see page 3-2. If you have questions about the menus or get confused about where you are in the menus, see page 4-2.

Each command is described in detail on the following pages. Factory default settings are enclosed in parentheses ().

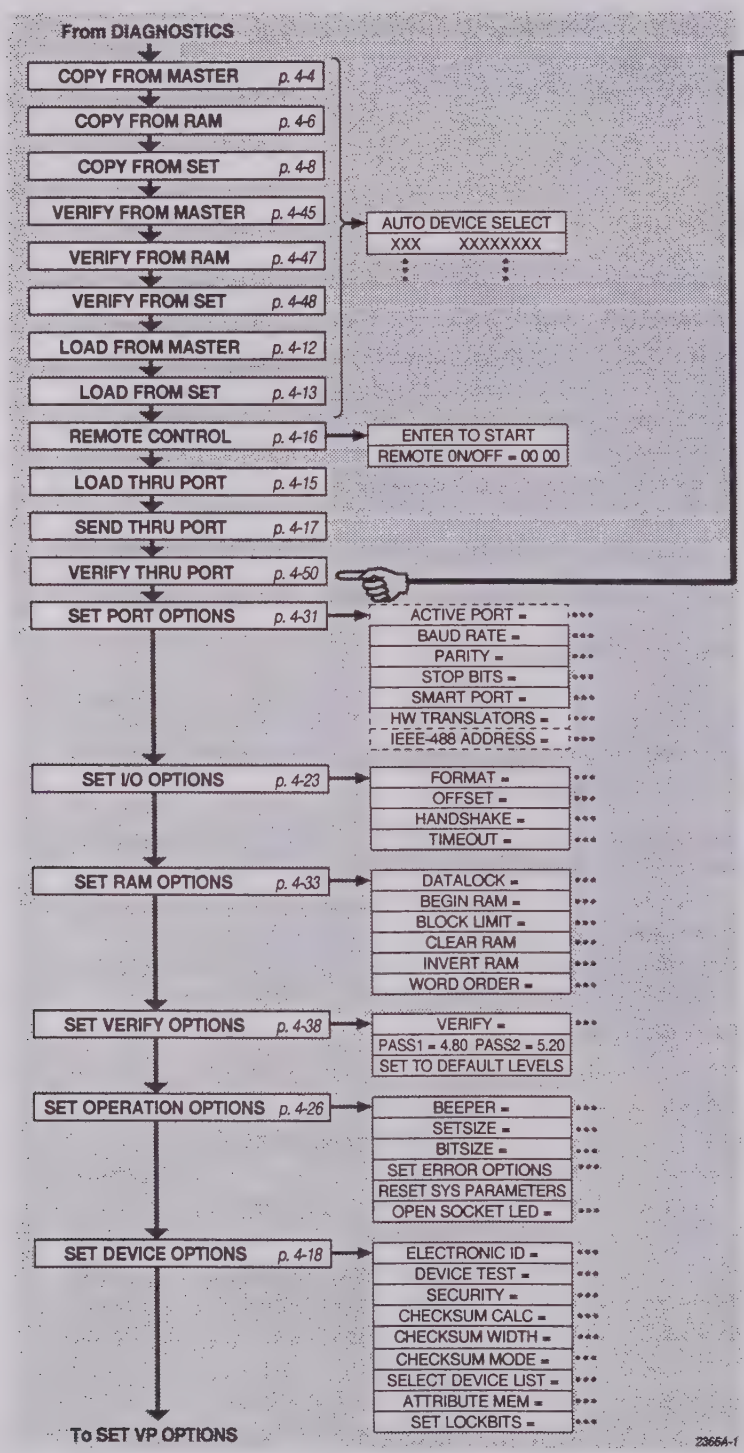
Note: Some commands require that devices be installed in sockets on the programmer. When placing a device in a rail or socket, refer to the "Installing Devices" section on page 3-4 for device installation procedures.

Command Listing

Copy From Master 4-4
Copy From RAM..... 4-6
Copy From Set..... 4-8
Diagnostics 4-10
Load From Master..... 4-12
Load From Set 4-13
Load Thru Port 4-15
Remote Control 4-16
Send Thru Port..... 4-17
Set Device Options 4-18
Set I/O Options..... 4-23
Set Operation Options . 4-26
Set Port Options..... 4-31
Set RAM Options..... 4-33
Set Variable Parameters Options..... 4-37
Set Verify Options 4-38
Statistics 4-40
Verify From Master..... 4-45
Verify From RAM 4-47
Verify From Set 4-48
Verify Thru Port..... 4-50
View Configuration..... 4-51
View Master Checksum .. 4-52
View Master ID 4-53

PSX Command Structure (Menus)

The following diagrams summarize the PSX's menu and command structure. Use the PSX keys (EXIT , ^ , v , ENTER) to move through the menu structure. The text (enclosed in boxes) shows what is displayed on the PSX's LCD.



For example, if you start at

```
VERIFY THRU PORT
```

press v to move (↓) to

```
SET PORT OPTIONS
```

press v to move (↓) to

```
SET I/O OPTIONS
```

press ENTER to move (→) to

```
FORMAT =
```

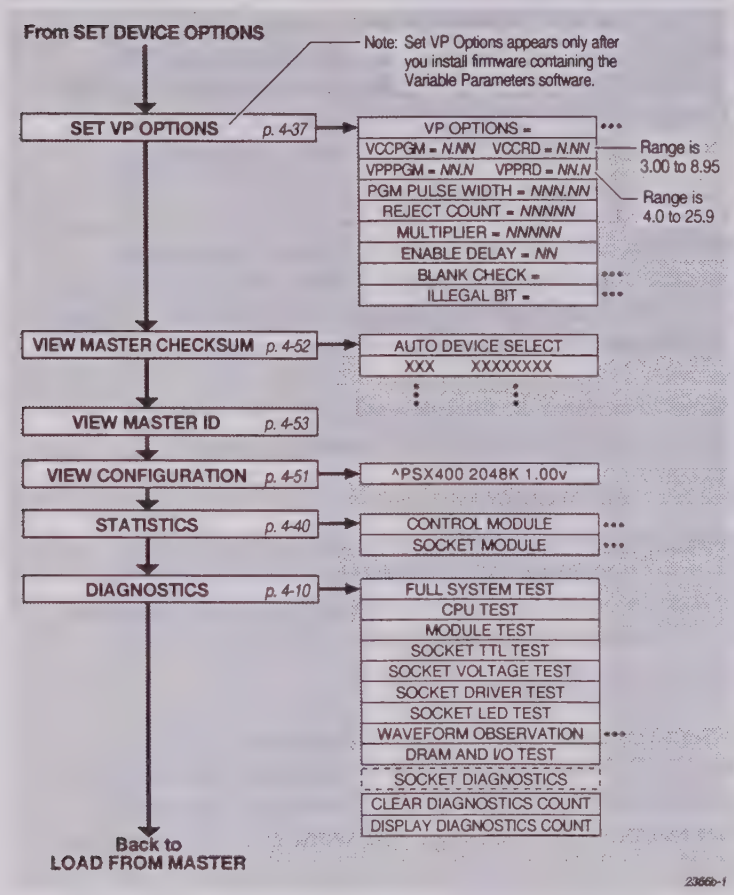
press ^ to move (↑) to

```
TIMEOUT =
```

press EXIT to move (←) to

```
SET I/O OPTIONS
```

(PSX Command structure continued)



Notes

Default Settings Appear as *Blinking* Text

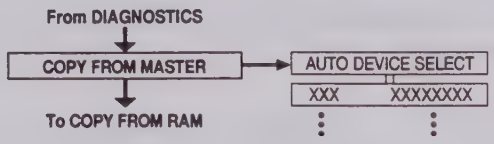
If a menu item appears as **blinking** text, it is the default setting for the command. If you do not want to use this setting, scroll through the menus until the desired setting is displayed and press ENTER .

Lost in Menus? Press Exit

If you are confused about where you are in the menus, press EXIT .

Continue to press EXIT until you find where you are in the menus. A **beep** indicates that you have reached a top-level (main) menu. The top-level menus are shown on the far left of this page.

Copy From Master



Use this operation to copy the data from a master device inserted in a master socket to devices installed in the rail sockets. The Copy From Master operation is the default command for the PSX and is displayed when the programmer is powered up. Use the following procedure to copy the master device data to blank devices.

Note: You can install only DIP devices in the master socket unless your device is supported by a Master Socket Adapter. In addition, if Micro modules are installed, you cannot use a ***Copy From Master*** *operation to copy data from the master socket.*

Attempting to perform an unsupported operation using the master socket usually generates the following message:

```
MASTER NOT SUPPORTED
```

In this case, perform a ***Load From Master*** *(using the rail sockets) or a* ***Load From Set*** *(with setsize of 1) operation to load the data into RAM. Perform a* ***Copy from RAM*** *operation to program devices with the data stored in RAM.*

1. Select **Copy From Master.**
2. Select the manufacturer and device. If the rails or modules installed on the PSX support more than one package, the PSX displays a submenu of available socket modules. Select the module that supports the package you want to program. The PSX displays

```
INSERT DEVICES
CLOSE DIAL TO COPY (blinks)
```

3. Insert and lock the master device into the master socket on the rail.

   For parallel rail programming, install the master device in either of the two master sockets. For alternate rail programming, install a master device in each master socket.

4. Insert the devices to be programmed into the rail sockets.

5. Turn the dial(s) to the closed/start position to process devices. The PSX displays

```
TESTING DEVICES *
```

```
PROGRAMMING DEVICES *
0% ———-100%
```

```
Verifying devices *
```

When processing is complete, the LED below each socket illuminates. If there are no failures, the programmer displays

```
COPY COMPLETE - OKAY
CHECKSUM=XXXX
```

where *XXXX* represents the checksum of the data.

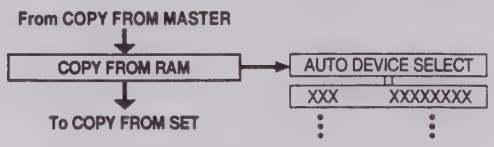
If there are failures, the programmer displays

```
COPY COMPLETE - ERRORS
```

and ERRORS is blinking. See "Errors and Messages" on page 3-18 for an explanation of how to scroll through the messages. Refer to Chapter 6, "Messages," for a description of each message and suggested corrective action.

6. Turn the dial(s) to the open position.
7. Remove the programmed devices.

Copy From RAM



Use the **Copy From RAM** command to copy the data from programmer RAM to blank devices installed in the sockets. Before performing this procedure, you must load the programming data into RAM using either a **Load From Master, Load From Set,** or **Load Thru Port operation.**

1. Select **Copy From RAM.**
2. Select the manufacturer and device. If the rails or modules installed on the PSX support more than one package, the PSX displays a submenu of available socket modules. Select the module that supports the package you want to program. The PSX displays

```
INSERT DEVICES
CLOSE DIAL TO COPY
```

3. Insert and lock the devices to be programmed into the sockets.

   For parallel rail programming, install devices in both rails. For alternate rail programming, install devices in the rail indicated by the arrows on the second line of the display.

4. Turn the dial(s) to the closed/start position to start processing. The programmer displays

```
TESTING DEVICES *
```

```
PROGRAMMING DEVICES *
0% ——— 100%
```

```
VERIFYING DEVICES *
```

   When processing is complete, the LED below each socket illuminates. (See page 3-17 for an explanation of the color meanings.)

   If there are no failures, the PSX displays

```
COPY COMPLETE - OKAY
CHECKSUM=XXXX
```

   where *XXXX* represents the checksum of the data.

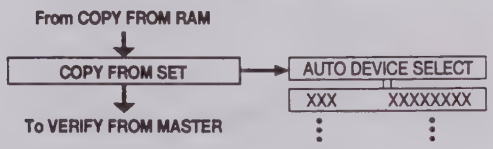
If there are failures, the PSX displays

```
COPY COMPLETE - ERRORS
CHECKSUM=****
```

and ERRORS is blinking. See "Errors and Messages" on page 3-18 for an explanation of how to scroll through the messages. Refer to Chapter 6, "Messages," for a description of each message and suggested corrective action.

5. Turn the dial(s) to the open position and remove the programmed devices.

Copy From Set



Use the **Copy From Set** command to copy the data from RAM to a set of devices installed in the sockets. This operation copies different RAM data into each device of the set. Before performing this procedure, you must load the programming data into RAM using either a **Load From Set** or a **Load Thru Port** operation.

1. Select **Copy From Set.** The top line of the display shows the current setsize and bitsize. Make sure these options are set correctly. If you want to change the setsize or bitsize, press [EXIT] and select the **Set Operation Options** menu.

Note: Performing a Load from Set with a set size of 1 is the same as performing a ***Load From Master*** *except that a* ***Load From Set*** *loads from the rail sockets.* **Copy from RAM** *should be used to program devices if the set size is 1.*

2. Select the manufacturer and device. If the rails or modules installed on the PSX support more than one package, the PSX displays a submenu of available socket modules. Select the module that supports the package you want to program. The PSX displays

```
INSERT DEVICE SET
CLOSE DIAL TO COPY
```

3. Insert the devices to be programmed into the sockets.

   The device installed in socket 1 of the upper rail is programmed with the first block of RAM data; the device in socket 2 is programmed with the next block of RAM data, and so on until the setsize is reached. You can program multiple sets with one **Copy From Set** operation by installing more than one set of devices in the sockets.

4. Turn the dial(s) to the closed/start position to begin processing. The PSX displays

```
TESTING DEVICES *
```

```
PROGRAMMING SETS *
0% ——— 100%
```

```
VERIFYING SETS *
```

   When processing is complete, the LED below each socket illuminates. If there are no failures, the PSX displays

```
COPY COMPLETE - OKAY
CHECKSUM=XXXX
```

   where *XXXX* represents the checksum of the set data.

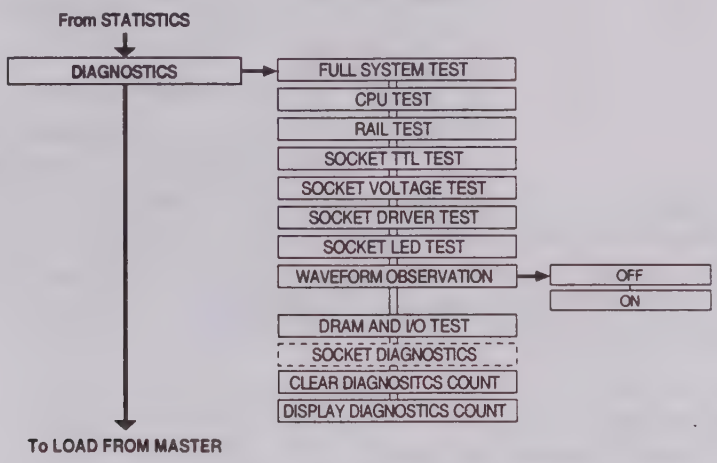
If there are failures, the PSX displays

```
COPY COMPLETE - ERRORS
CHECKSUM=****
```

and ERRORS is blinking. See "Errors and Messages" on page 3-18 for an explanation of how to scroll through the messages. Refer to Chapter 6, "Messages," for a description of each message and suggested corrective action.

5. Turn the dial(s) to the open position and remove the programmed devices.

Diagnostics



The Diagnostics menu enables you to perform various diagnostic tests on the programmer to ensure the integrity of its operation.

Note: Diagnostics cannot be performed if Data Lock is On (see the "Set Data Lock" section on page 4-33 for information).

The table lists and describes the tests.

Test	Description
Full System Test	CPU analog voltages, DRAM, I/O, and modules
CPU Test	CPU analog voltages
Rail Test	All installed rails
Socket TTL Test	TTL level stimulus at rail sockets
Socket Voltage Test	Static voltage levels at rail sockets
Socket Driver Test	Analog waveforms at rail sockets
Socket LED Test	LED test on installed rails
Waveform Observation	Enable/disable continuous device read/write mode
DRAM and I/O Test	RAM, serial, and parallel ports

To run a diagnostic test, select the desired test from the Diagnostics menu.

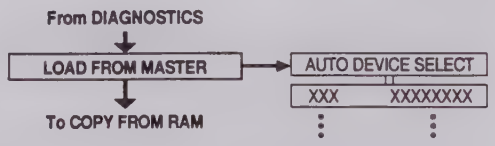
When running a diagnostic test, you may need to do the following:

- For socket tests, select the rail type to be tested if more than one type of rail is installed.
- When different rail types are installed, the programmer prompts for the rail you want to run the test on. If only one rail type is installed, the test is performed automatically for the installed rail(s).
- For accurate Memory rail diagnostics, install memory rails that each have two DIP48 socket modules installed.

If the programmer displays a message after performing any of these tests, refer to Chapter 6, "Messages," for a description of each message and suggested corrective action.

For additional help on running diagnostic tests, refer to the "Diagnostics" section on page 5-3. For further details, call your nearest Customer Support office as listed in Appendix A.

Load From Master



Use the **Load From Master** command to load programmer RAM with the data from a device. (You cannot perform this operation if Data Lock is On — see the "Set Data Lock" section on page 4-33 for information.)

Note: Load From Master is disabled for microcontrollers when Micro modules are installed. Use Load From Set for microcontrollers.

1. Select **Load From Master**.
2. Select the manufacturer and device. The PSX displays

```
INSERT MASTER
ENTER TO LOAD
```

   The second line of the display blinks.

3. Insert the source device into the master socket (DIP devices) or in socket 1 of the upper rail (for non-DIP devices). (Socket 1 is the left-most socket in the upper rail or upper left module if Memory rails are installed.)

---

*Note: The **Load From Master** operation loads data from the device (almost always a DIP device) inserted in the master socket. Do not use a Load From Master to load from a device inserted in socket 1 (upper left rail socket).*

*To load from a device inserted in socket 1, perform a **Load From Set** with a setsize of 1.*

4. Lock the device into the socket and press ENTER . The PSX displays

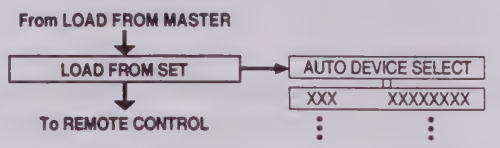
```
LOADING FROM MASTER *
```

```
LOAD COMPLETE - OKAY
CHECKSUM=XXXX
```

   where *XXXX* represents the checksum of the data. If a problem occurs during any part of the operation, the programmer stops and displays a message. (See Chapter 6, "Messages," for an explanation.)

5. Unlock the device from sockets.
6. Remove the device.

Load From Set



Use the **Load From Set** command to load programmer RAM with the data from a set of master devices (more than one device). (You cannot perform this operation if Data Lock is On — see the "Set Data Lock" section on page 4-33 for information.)

The first device of the set must be installed in socket 1 (the socket at the left end of the rail). If two rails of the same type are installed, the first device of the set must be installed in socket 1 of the upper rail. You must load all the devices of the set in one Load From Set operation.

1. Select **Load From Set**. The top line of the display shows the current setsize and bitsize. Make sure these options are set correctly. If you want to change the setsize or bitsize, press [EXIT] and select the **Set Operation Options** menu.

   For instance, to load from a single master device inserted in socket 1, set the setsize to 1 (one).

2. Select the manufacturer and device. If the rails or modules installed on the PSX support more than one package, the PSX displays a submenu of available socket modules. Select the module that supports the package you want to load from. The PSX displays

   ```
   INSERT MASTER SET
   CLOSE DIAL TO LOAD
   ```

   The second line of the display blinks.

3. Insert the master (source) devices in the rail/module.

   Insert the devices of the set in adjacent sockets with the first device of the set in socket 1.

   For parallel rail programming, you can install the rest of the master device set in the lower rail if it does not fit in the upper rail. For alternate rail programming, install the master device set in only the upper rail.

4. Turn the dial(s) to the closed/start position to process devices. The PSX displays

```
LOADING FROM SET *
```

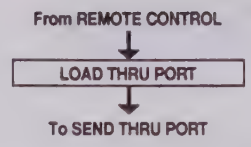
```
LOAD COMPLETE - OKAY
CHECKSUM=XXXX
```

where XXXX represents the checksum of the data. If a problem occurs during any part of the operation, the programmer stops and displays a message. (See Chapter 6, "Messages," for an explanation.)

5. Turn the dial(s) to the open position.
6. Remove the master set of devices.

Note: For more information on set programming, request the Application Note, "Set Programming and Gang Programming" from Customer Support at the telephone or fax numbers specified in Appendix A.

Load Thru Port



Use the **Load Thru Port** command to load data from a host system to programmer RAM via one of the I/O ports. (This operation cannot be performed if Data Lock is On — see the "Set Data Lock" section on page 4-33 for information.)

1. Select **Load Thru Port**. The PSX displays

   ```
   LOAD ACTIVE_PORT FORMAT
   ENTER TO START
   ```

   The first line of the display shows the current port and translation format. The second line of the display blinks.

   To change the current port and translation format, go to the **Set Port Options** or **Set I/O Options** menus to change the parameters.

2. Press [ENTER]. The PSX displays

   ```
   LOADING THRU PORT *
   ```

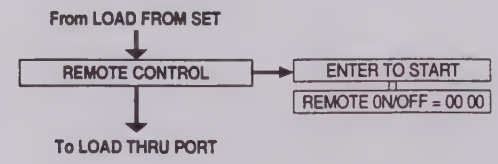
3. Initiate the download from the host computer. When the Load Thru Port procedure is complete, the PSX displays

   ```
   LOAD PORT COMPLETE
   CHECKSUM=XXXX
   ```

   where *XXXX* represents the checksum of the data.

   If a problem occurs during any part of the operation, the programmer stops and displays a message. (See Chapter 6, "Messages," for an explanation.)

Remote Control



Enable/Disable CRC

Use the **Remote Control** command to enable or disable computer remote control (CRC).

1. Select **Remote Control**. The PSX displays

```
REMOTE CONTROL
ENTER TO START
```

2. To change the programmer's operating mode to CRC, press [ENTER]. Small $^{r}_{c}$ characters appear in the upper left corner of the display indicating that the programmer is in CRC.

   To disable CRC, press [^] + [EXIT] (press the up arrow key and, while still pressing the key down, press the Exit key).

Remote On/Off = 00 00

Use this option to specify a code to remotely enable or disable CRC.

Note: To operate the PSX with TaskLink, the CRC enable/disable code must be disabled (set to zeros: **Remote On/Off = 00 00***).*

1. Select **Remote Control**.
2. Select **CRC On/Off**. The PSX displays

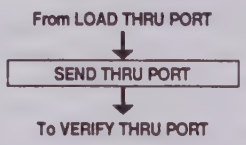
```
REMOTE MODE
REMOTE ON/OFF = XX XX
```

   where the left *XX* is the code for enabling CRC and the right *XX* is the code for disabling CRC. For example, **Remote On/Off = 11 13** means that the host computer or terminal sends ASCII code 11 ([Ctrl] + [Q]) to enable CRC, and code 13 ([Ctrl] + [S]) to disable CRC.

   To change the codes, press [ENTER]. The left digit of the left group blinks. Use the arrow keys to scroll through the range of hex numbers, 0 through F. When the desired number is displayed, press [ENTER]. The next digit to the right blinks. Repeat this process until the desired codes have been entered.

3. To exit the CRC On/Off feature, press [EXIT].

Send Thru Port



Use the **Send Thru Port** command to send the data in RAM to the devices in the sockets via one of the I/O ports.

1. Select **Send Thru Port**. The PSX displays

```
SEND ACTIVE_PORT FORMAT
ENTER TO START
```

   The first line of the display shows the current port and translation format. The second line of the display blinks.

   To change the current port and translation format, go to the Set Port Options or Set I/O Options menus to change the parameters.

2. Press [ENTER]. The PSX displays

```
SENDING THRU PORT *
```

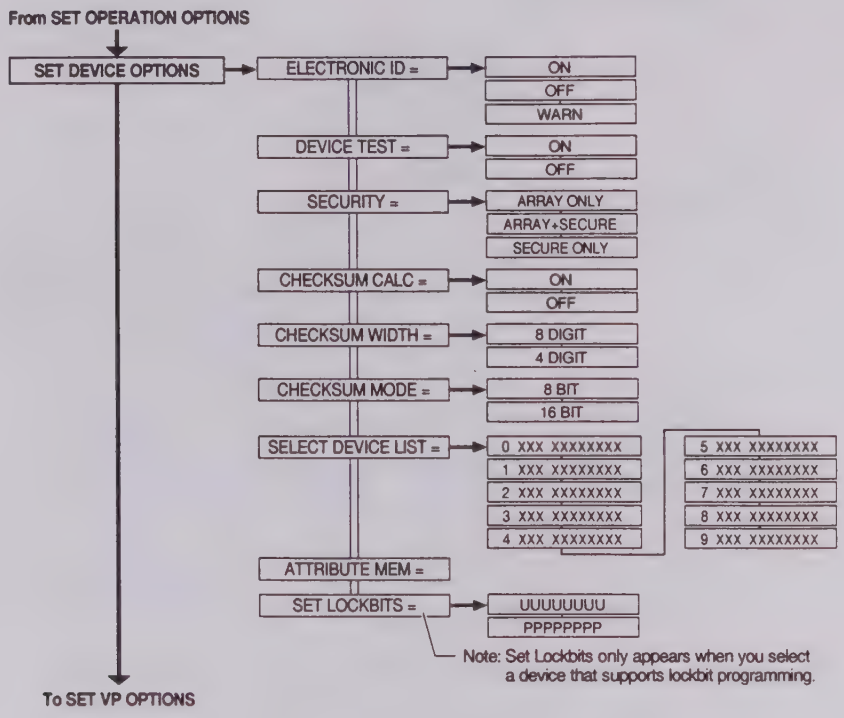
3. When the Send Thru Port procedure is complete, the PSX displays

```
SEND PORT COMPLETE
CHECKSUM=XXXX
```

   where *XXXX* represents the checksum of the data.

   If a problem occurs during any part of the operation, the programmer stops and displays a message. (See Chapter 6, "Messages," for an explanation.)

Set Device Options



Set Device Options allows you to enable (On or Warn) or disable (Off) the Electronic ID feature, set security bit programming options, select devices for a customized device list, and select options for performing a checksum on data. Use the following procedures to set the device options. The default setting for each option is shown in parentheses.

Electronic ID (On)

The Electronic ID feature shortens the device selection procedure by automatically identifying the installed device(s) and checking to make sure that the installed devices' IDs are compatible with the selected device type. If the types do not match, the devices are disabled for the operation.

When Electronic ID is set to **ON**, Electronic ID is always checked.

When Electronic ID is set to **Warn**, any incompatible device is identified with a yellow LED. You can then continue the operation on the device(s) by pressing [ENTER] or discontinue the operation by pressing [EXIT] .

When Electronic ID is disabled (**Off**), a device ID check is performed only when Auto Device Select is enabled. (See the "Auto Device Select" section on page 3-14, for a discussion of the Auto Device Select feature.)

1. Select **Set Device Options.**
2. Select **Electronic ID =** . The second line of the display shows the current Electronic ID setting.

   To change the setting, press [ENTER] . The Electronic ID setting blinks.
3. Scroll to the desired setting.
4. Press [ENTER] . The second line of the display shows the selected setting.

Device Test (On)

The Device Test option allows you to disable Device Insertion tests that are normally performed when a device is programmed.

CAUTION: When Device Test is disabled, the programmer attempts to program devices even if they are inserted incorrectly. The device can be damaged if inserted incorrectly in the socket.

1. Select **Set Device Options.**
2. Select **Device Test =** . The PSX displays the current setting.

   To change the setting, press [ENTER] .
3. Scroll to the desired setting.
4. Press [ENTER] . The display shows the selected setting.

Select Security Option (Array only)

This option programs the security bit of devices that support security data protection. The PSX may not be able to read data contained in a device with a programmed security bit. The security bit is programmed during a Copy From RAM or a Copy From Master operation. The available settings are described in the table.

Setting	Description
ARRAY ONLY	Data is copied into the device but the security bit is not programmed, allowing the data to be read (and copied) by a programmer.
SECURE ONLY	The security bit only is programmed, "locking" the data already contained in the device.
ARRAY + SECURE	Data is copied into the device. The data is then verified and the security bit is programmed to lock the data.

Note: Once the security bit is programmed, the programmer may not be able to verify the device.

1. Select **Set Device Options**.
2. Select **Security =** . The second line of the display shows the current security setting.

   To change the setting, press [ENTER] . The security setting blinks.
3. Scroll to the desired setting.
4. Press [ENTER] . The second line of the display shows the selected setting.

Enable/Disable Checksum Calculation (On)

This option enables or disables checksum calculation. Checksum calculation is performed on the transferred data after a Copy, Load, or Verify operation and enables you to verify that the data was transferred correctly. A checksum calculation is always performed after I/O port transfers even if the checksum calculation is disabled. Use the following procedure to enable or disable the checksum option.

1. Select **Set Device Options**.
2. Select **Checksum Calc =** . The second line of the display shows the current checksum calculation setting.

   To change the setting, press [ENTER] . The setting blinks.
3. Scroll to the desired setting.
4. Press [ENTER] . The display shows the selected setting.

Select Checksum Display Width (8 digits)

This option allows you to select either a 4- or 8-digit checksum (displayed after a Copy, Load, or Verify operation is performed). The 8-digit checksum is a more accurate checksum, but not all development systems support an 8-digit checksum. Use the following procedure to select either a 4- or 8- digit checksum.

1. Select **Set Device Options**.
2. Select **Checksum Width =** . The second line of the display shows the current checksum width setting.

   To change the setting, press [ENTER] . The `4DIGIT` or `8DIGIT` at the end of the line blinks.
3. Scroll to the desired setting.
4. Press [ENTER] . The display shows the selected setting.

Select Checksum Calculation Mode (Bytewise)

This option allows you to set the checksum calculation: bytewise or wordwise. If set to 8-bit, the checksum is calculated bytewise for 8- and 16-bit devices. If set to 16-bit, the checksum is calculated wordwise for 16-bit devices only. When an 8-bit device is selected, a bytewise checksum calculation is automatically used, even if a 16-bit checksum calculation is selected. Use the following procedure to select an 8- or 16-bit checksum calculation.

1. Select **Set Device Options**.
2. Select **Checksum Mode =** . The second line of the display shows the current checksum mode setting.

   To change the setting, press [ENTER] . The `8BIT` or `16BIT` at the end of the line blinks.
3. Scroll to the desired setting.
4. Press [ENTER] . The display shows the selected setting.

Select Device List

This option allows you to customize the online device list so that the ten devices you use most frequently appear at the top of the list for quick access. You can select any of the devices from the regular device list to be included in the customized device list.

Use the following procedure to create a customized device list.

1. Select **Set Device Options**.
2. Select **Select Device List**.

   The line number appears on the left. If you have never entered any devices in the customized device list, the PSX displays

   ```
   SELECT DEVICE LIST
   * NO DEVICE SELECTED
   ```
3. Select the line you want to change, and press [ENTER] . The first manufacturer and device on the regular device list appears and blinks.
4. Scroll through the list until the manufacturer and device you want to select is displayed. Press [ENTER] . The device selection stops blinking, indicating that it has been entered into the customized device list.

To delete a selected device without adding a new device, select **No Device Selected** at the beginning of the online device list.

The Select Device List devices are identified by an asterisk on the left.

You can enter up to ten devices in the customized device list in this manner. When you exit, the devices in the customized device list are renumbered consecutively and any gaps are closed.

Attribute Memory (On)

When programming memory cards with the 68MEMCARD socket modules, use ATTRIBUTE MEM to enable or disable programming of the attribute memory that may be available on the memory cards you are programming.

Note: Not all memory cards support attribute memory.

When loading data from memory cards, use this option to enable or disable loading of the data from the attribute memory that may be available on the memory cards you are loading from.

When enabled and attribute memory is available, the PSX **programs to** all memory on the card (including attribute memory) when COPY FROM RAM or COPY FROM SET is selected and **loads from** all memory on the card (including attribute memory) when LOAD FROM SET is selected.

Attribute memory data is copied from or loaded to the RAM address immediately following the memory card device size. For example, if the memory card contains 1024 bytes, the attribute memory data will be located beginning at RAM address 1024. When the ATTRIBUTE MEM option is enabled, attribute memory data is included when calculating the checksum.

Set Lockbits

The Set Lockbits option allows you to select individual lockbits for programming during a Copy from RAM or a Copy from Master operation on devices that support this feature.

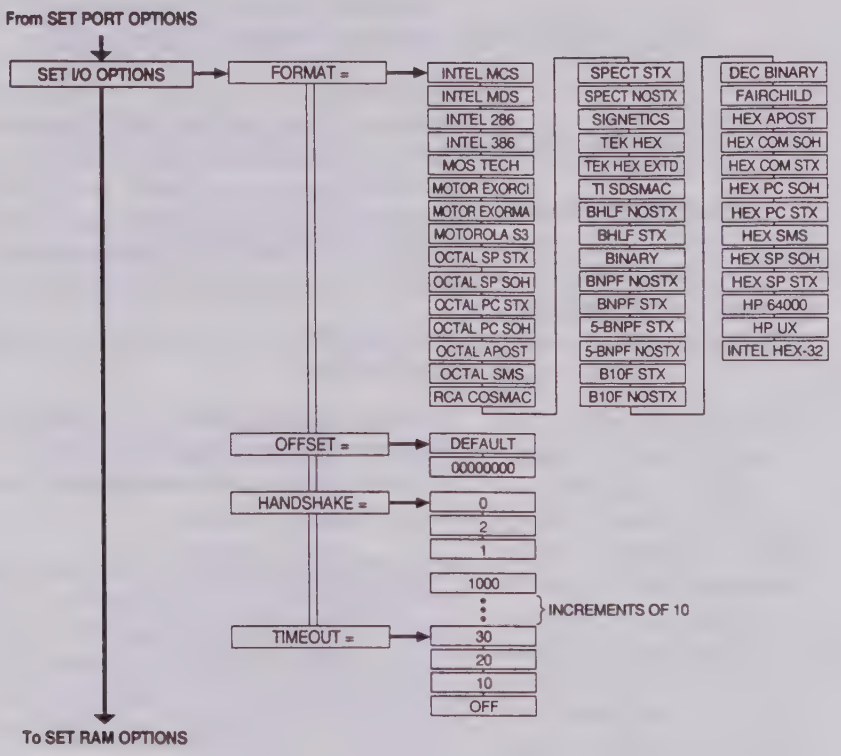
Use Set Lockbits in conjunction with the Set Security option, which displays the number of lockbits supported by the device. Programmed lockbits are represented by P; unprogrammed lockbits are represented by U. The order is from left to right with the left lockbit being lockbit number 1. The default, which is All Lockbits Programmed, is reset during powerup and when a new device is selected.

Note: The Set Lockbits option is displayed only when the currently selected device supports lockbit programming.

1. Select **Set Device Options**.
2. Select **Lockbits =** . The second line of the display shows the current lockbit setting.

   To change the setting, press ENTER . The first lockbit blinks.
3. The lockbits are set one position at a time. Scroll to the desired setting.
4. Press ENTER . The cursor moves one position to the right. Set each lockbit until the entire setting is correct.

Set I/O Options



These options allow you to select the desired data translation format, address offset, handshake, and timeout for input/output (upload/download) operations. The I/O defaults are shown in parentheses in the headings.

I/O Format (Intel MCS)

1. Select **Set I/O Options**. Scroll until the second line of the display shows the I/O format.

   The I/O format is the format into which data is translated for an output operation (Send Thru Port) and in which data is accepted for an input operation (Load Thru Port).

   To change the I/O format, press [ENTER]. The I/O format blinks.

2. Scroll to the desired I/O format setting. For a list of available data translation formats and their descriptions see "Translation Formats" on page 4-54.

3. Press [ENTER]. The second line of the display shows the selected I/O format setting.

Address Offset (First Address Downloaded)

1. Scroll until the second line of the display shows the address offset.

Note: If the format selected uses a 16-digit offset (for example, extended Tek Hex), the low-order 8 digits and the high-order 8 digits are displayed in two displays.

When DEFAULT = FFFFFFFF is selected, the programmer assigns a record address of 0000 to the first outgoing data record and stores the first incoming record in the beginning RAM address selected (see "Set RAM Options" for instructions on selecting the beginning RAM address). For an explanation of the I/O address offset refer to the "Address Offset" Application Note (see page 4-54).

To change the address offset, press [ENTER]. The address offset blinks.

2. The offset address is set one position at a time, beginning with the most significant digit. Use the arrow keys to increase or decrease the digit (in hexadecimal) to the value desired for each position.

3. When the value displayed for the particular position is correct, press [ENTER]. The cursor moves to the next most significant position. Do the same thing for each digit position until the displayed offset address is correct. To set the offset address to Default, set all of the digits to F. If you do not need to change all of the digits, press [EXIT] when finished.

Note: To specify a 16-digit offset address, advance to the high order offset display and repeat steps 2 and 3.

4. Press [ENTER]. The second line of the display shows the selected address offset setting.

Handshake Option (0)

1. Scroll until the second line of the display shows the handshake option. The handshake options are defined in the following table.

   To change the handshake option, press [ENTER]. The handshake option blinks.

Option	Input Function	Output Function
0	Data is received without handshaking.	Data transmission is halted upon receipt of an X-Off character; transmission resumes upon receipt of an X-On character.
1	Transmits an X-On character when ready to receive data; transmits an X-Off character if the receiver buffer is full; transmits an X-On character if the receiver buffer is empty; transmits an X-Off after all the data is received.	Transmits a Punch On character prior to data transmission. Data transmission is halted upon receipt of an X-Off character; transmission resumes upon receipt of an X-On character. A Punch Off character is sent when the transmission is complete.
2	Data is received without handshaking.	Transmits data only after receiving an X-On character. Data transmission is halted upon receipt of an X-Off character; transmission resumes upon receipt of an X-On character.

2. Scroll to the desired handshake option.
3. Press [ENTER]. The second line of the display shows the selected handshake option.

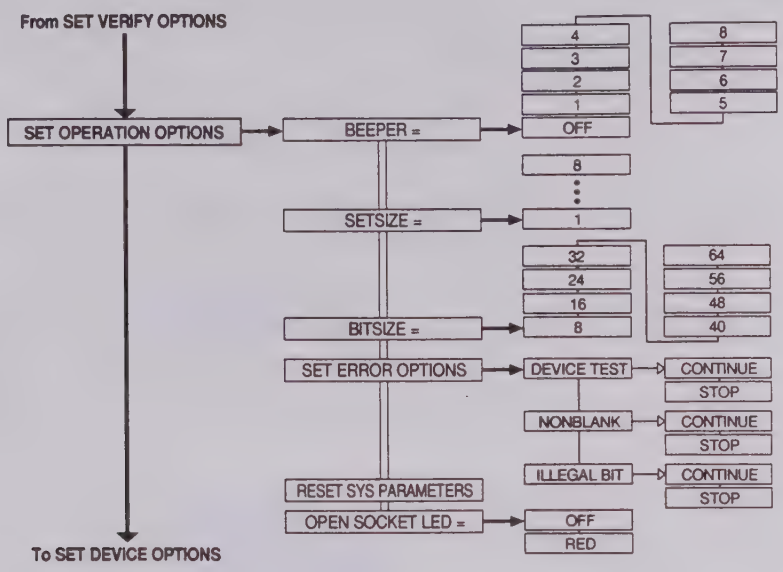
Timeout (30)

1. Scroll until the second line of the display shows the timeout setting.

   To change the timeout setting, press [ENTER]. The timeout setting blinks.

2. Scroll to the desired timeout setting.
3. Press [ENTER]. The second line of the display shows the selected timeout setting.

Set Operation Options



These options allow you to enable or disable the programmer's beeper, set the setsize (number of devices in a set to be loaded or programmed) and the bitsize of the data to be programmed into a set of devices, select whether the programmer should stop or continue when an error is generated, select parallel or alternate module programming, reset system parameters, and change the open socket LED color. Use the following procedures to set the options. The default setting for each option is shown in parentheses.

Select Beeper Pitch (7)

You can enable or disable the programmer beeper. The available settings are Off, and 1 through 8. Select 1 through 8 to enable the beeper and set the beeper pitch. A selection of 1 is the highest pitch; 8 is the lowest pitch. Setting each programmer beeper to a unique pitch allows you to more easily identify which programmer produced the sound.

1. Select **Set Operation Options.**
2. Select **Beeper =** . The second line of the display shows the current beeper selection.

   To change the beeper setting, press ENTER .
3. Scroll to the desired setting.
4. Press ENTER . The second line of the display shows the selected setting.

Select Setsize (1)

The Setsize option allows you to specify the number of devices in the set to be loaded, programmed, or verified. For a **Copy From Set** operation, the programmer copies RAM data into consecutive devices up to the setsize. If more devices are installed, the programmer copies the same RAM data into the additional devices, producing duplicates of the first set of devices programmed. (This operation cannot be performed if Data Lock is On — see the "Set Data Lock" section on page 4-33 for information.)

1. Select **Set Operation Options**.
2. Select **Setsize**. The second line of the display shows the current setsize. To change the setting, press [ENTER] .
3. Scroll to the desired setting.
4. Press [ENTER] . The second line of the display shows the selected setting.

Select Bitsize (8)

The Bitsize option allows you to select the bitsize (word width) of the data to be programmed into a set of devices. The Bitsize selection should match the bitsize of the processor that will be accessing the data programmed into the set of devices. (This operation cannot be performed if Data Lock is On — see the "Set Data Lock" section on page 4-33 for information.)

1. Select **Set Operation Options**.
2. Select **Bitsize**. The second line of the display shows the current bitsize.
3. Scroll to the desired setting.
4. Press [ENTER] . The second line of the display shows the selected setting.

Set Rail Mode

Change the rail mode setting as follows:

1. Select Set Operation Options.
2. Select Rail Mode. The second line of the display shows the rail setting.

   To change the setting, press [ENTER] and use the arrow keys to toggle the setting.
3. Press [ENTER] .

Using Alternate Rail Mode

To use alternate rail programming, perform the following steps:

1. Power down the programmer.
2. Install two identical rails on the programmer.
3. Power up the programmer.

4. Select one of the device-related operations mentioned above. Proceed with that operation as described in its operation procedure. When the procedure tells you to insert the devices and turn the dial to the closed/start position, look for two arrows at either end of the second line of the display. These arrows indicate which rail to insert the devices into (the active rail).
5. Insert the devices into the active rail (lower rail if the arrows point down; upper rail if the arrows point up).
6. Turn the active rail dial to the closed/start position. The operation begins on the active rail.
7. While the operation is in process, insert devices into the other rail. Turn the dial to the closed/start position. The operation is performed on the second rail after the operation on the first rail is complete and the first rail dial is turned to the open position.
8. Label and remove the programmed devices in the first rail and load it with blank devices. Turn the dial to the closed/start position. The operation is repeated on this rail after the operation on the other rail is complete and the dial is turned to the open position.

Errors When Using Alternate Rail Mode

When an error occurs, alternate rail programming is interrupted. Some errors cause the programmer to switch to the alternate rail, pause, or stop the operation as defined in the following list.

`NO DEVICES PRESENT`	Switches to alternate rail
`DEVICE INSERTION`	Pauses operation
`NO ELECTRONIC ID`	Pauses operation
`INVALID ELECTRONIC ID`	Pauses operation
`BLOCK LIMIT ERROR`	Stops operation
`INVALID SET ERROR`	Stops operation

Set Error Options

Set Error Option allows you to specify whether or not the programmer continues or stops operations when a device test, non-blank, or illegal bit test error is encountered. If you select **Stop**, the programmer stops operations when an error is encountered and displays a message about the error that occurred. If you select **Continue**, the programmer completes operations and then displays a message about the error that occurred.

1. Select **Set Operation Options.**
2. Select **Set Error Options.**
3. Select the setting you want to change.

   To change the option for the displayed test, press [ENTER], then scroll to the desired setting.
4. Press [ENTER] to accept the new setting.
5. To change the setting for another test, repeat steps 3 and 4.

Note: If a device fails the device test, the socket LED remains red while the nonblank and illegal bit tests are being performed.

Rail Mode (Parallel)

This option does not appear on the Set Operation Options menu of the PSX500 programmer, or if one rail or two dissimilar rails are installed on the PSX1000 control module.

Parallel

Parallel rail programming is the factory default. Parallel programming uses a master device to program the devices in both rails simultaneously when two identical rails are installed.

Alternate

Use alternate rail programming to speed up production flow by alternating the programming process from one rail to the other. While the programmer is processing devices on one rail, the operator can label and remove programmed devices from the other rail and load it with blank devices. Alternate rail programming requires that two identical rails be installed, each with its own master device. Both master devices must be the same device type, but they do not need identical data. Data in RAM can be used as the programming data source when you want to program the devices in both rails with the same data.

Note: Auto Device Select is not supported when using alternate rail programming. Select the device manually.

Alternate rail programming affects the following device-related operations:

Copy From Master	Copy From Set
Copy From RAM	Load From Set
Verify From Master	Verify From Set
Verify From RAM	

Resetting System Parameters

All of the system parameters you select (such as device type, parity, and baud rate) are saved on powerdown and become the defaults until you change them. To reset these parameters to the factory defaults (see page C-4), use the following procedure:

1. Select **Set Operation Options**.
2. Scroll to **Reset System Parameters**.
3. Press [ENTER] + [v] (press the Enter key and while still pressing the key down, press the down arrow key, then release both keys at the same time).

   The PSX might beep while you press the keys. You can ignore these beeps.
4. Press [ENTER] to reset system parameters to factory default values.

Open Socket LED (Red)

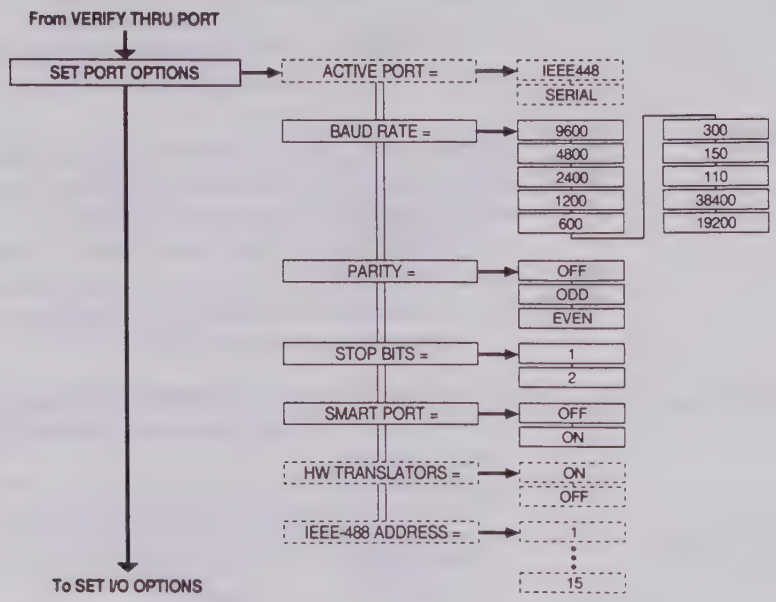
This option sets the LED color (Red or Off) for empty sockets. Setting this feature to OFF enables you to differentiate between devices the programmer cannot "see" (the light is not lit) and devices with verify errors after programming (the light is red).

CAUTION: Be sure that operators understand the meaning of the indicators to prevent acceptance of unprogrammed parts.

1. Select **Set Operation Options**.
2. Select **Open Socket LED =** . The second line of the display shows the current setting.

   To change the setting, press [^] or [v] .
3. Press [ENTER] .

Set Port Options



These options allow you to select the desired port and serial port options. The port defaults are shown in parentheses after the corresponding headings.

Note: To use the options in the boxes with dashed lines, you must have the PSX set up for IEEE-488 communication.

Active Port (Serial)

1. Select **Set Port Options**. Scroll until the second line of the display shows the active port. To change the active port, press [ENTER]. The active port blinks.
2. Scroll to the desired port.
3. Press [ENTER]. The second line of the display shows the selected active port.

Baud Rate (9600)

1. Scroll until the second line of the display shows the baud rate. To change the baud rate, press [ENTER]. The baud rate blinks.
2. Scroll to the desired baud rate.
3. Press [ENTER]. The second line of the display shows the selected baud rate.

Parity (Off)

1. Scroll until the second line of the display shows the parity setting. To change the parity setting, press [ENTER]. The parity setting blinks.
2. Scroll to the desired parity setting.
3. Press [ENTER]. The second line of the display shows the selected parity setting.

Stop Bits (1)

1. Scroll until the second line of the display shows the stop bits setting. To change this setting, press [ENTER]. The stop bits setting blinks.
2. Scroll to the desired stop bits setting.
3. Press [ENTER]. The second line of the display shows the selected stop bits setting.

SmartPort (On)

When enabled, the SmartPort feature senses the host's transmit and receive signals (commonly called Tx and Rx) and automatically connects the RS-232C port Tx and Rx signals to the host signals so you don't have to swap lines in your cable.

Note: If the host has a SmartPort capability, disable the SmartPort feature in the PSX.

1. Scroll until the second line of the display shows the SmartPort setting. To change this setting, press [ENTER]. The SmartPort setting blinks.
2. Scroll to the desired SmartPort setting.
3. Press [ENTER]. The second line of the display shows the selected SmartPort setting.

Hardware Translators (On)

When enabled, the hardware translators are supported with the following formats. Use these formats with TaskLink and an IEEE port for fastest throughput. The hardware translators are listed in the following table.

Format	Displayed Name	Code
Intel Hex-32	INTEL HEX-32	99
Intel Intellec 8/MDS	INTEL MDS	83
Intel MCS-86 Hex Object	INTEL MCS	88
Motorola 32-bit (S3 record)	MOTOROLA S3	95
Motorola EXORciser	MOTOR EXORCI	82
Motorola EXORmacs	MOTOR EXORMA	87

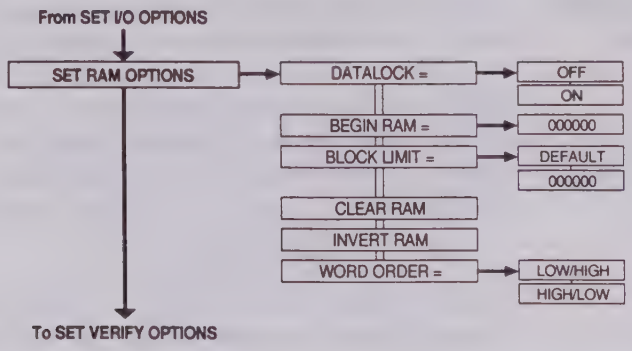
IEEE-488 Address (1)

The PSX IEEE-488 Address usually does not need to be changed from its default (1). You may wish to change the setting if you control more than one PSX, have other equipment on your IEEE-488 bus that must be set to address 1, or use your own IEEE-488 driver software instead of TaskLink.

Follow these steps to change the IEEE-488 address.

1. Select **Set Port Options**. Scroll until the second line of the display shows the IEEE-488 Address. To change the address, press [ENTER]. The `1` blinks.
2. Scroll to the desired selection. (The display returns to `1` when you scroll past `15`.)
3. Press [ENTER]. The selected IEEE-488 Address is displayed on the second line.

Set RAM Options



Use the **Set RAM Options** menu to enable and set the following features.

- Lock RAM to ensure security of your data.
- Set the beginning RAM address to/from which data will be transferred.
- Set the size of the block of data to be transferred.
- Clear data at all RAM addresses to 00.
- Invert (complement) data at all RAM addresses.
- Select data order for word wide device. (This feature is available only if the installed module supports 16-bit wide devices.)

Use the following procedures to change the options available under the **Set RAM Options** menu.

Set Data Lock (Off)

The Data Lock feature allows you to lock the data contained in programmer RAM so that it cannot be altered. When Data Lock is enabled, the following commands cannot be performed:

Load From Master	Invert RAM
Load From Set	Word Order
Load Thru Port	Setsize
Begin RAM	Bitsize
Block Limit	Clear Statistics
Clear RAM	Diagnostics

1. Select **Set RAM Options**.
2. Select **Data Lock**. The second line of the display shows the data lock setting.

   To change the data lock setting, press [ENTER]. The data lock setting blinks.
3. Hold the [v] key down and press [ENTER] to toggle the setting.

When the data lock mode is selected, DL appears in the upper right corner of the PSX's display as a reminder that Data Lock is enabled.

Set Beginning RAM Address (000000)

The beginning RAM address sets the first address of RAM into which data is loaded from a device or host computer. It also sets the address of the first data byte in RAM to be transferred out of RAM to a device or host computer. To set the beginning RAM address, perform the following procedure. (This operation cannot be performed if Data Lock is On — see the "Set Data Lock" section on page 4-33 for information.)

1. Select **Set RAM Options**.
2. Select **Begin RAM Address**. The second line of the display shows the current beginning RAM address.

   To change the beginning RAM address, press [ENTER]. The most significant digit of the beginning RAM address blinks.
3. The beginning RAM address is set one position at a time, beginning with the most significant digit. Use the arrow keys to increase or decrease (in hexadecimal) the value for each position.
4. When the displayed value for the particular position is correct, press [ENTER]. The cursor moves to the next most significant position. Repeat this process to select each remaining digit of the beginning RAM address.
5. Press [EXIT]. The second line of the display shows the selected address.

Set Block Limit (Device size)

The block limit sets the size of the data block to be transferred. The block limit is set in hexadecimal. A block limit of 000000 causes the programmer to set the block limit to the size of the currently selected device times the setsize and bitsize selected. (This operation cannot be performed if Data Lock is On — see the "Set Data Lock" section on page 4-33 for information.)

1. Select **Set RAM Options**.
2. Select **Block Limit**. The second line of the display shows the current block limit selected.

   To change the block limit, press [ENTER]. The most significant digit of the current block limit blinks.
3. The block limit is set one position at a time, beginning with the most significant digit. Use the arrow keys to increase or decrease (in hexadecimal) the value for each position.
4. When the displayed value for the particular position is correct, press [ENTER]. The cursor moves to the next most significant position. Repeat this process to select each remaining digit of the block limit.

5. Press [EXIT]. The second line of the display shows the selected block limit.

   If you entered 000000 as the block limit, the PSX displays default as the block limit.

Clear RAM

The Clear RAM option allows you to set all RAM data to 00. (This operation cannot be performed if Data Lock is On — see the "Set Data Lock" section on page 4-33 for information.)

1. Select **Set RAM Options**.
2. Select **Clear RAM**.
3. Press [ENTER] to start the operation. The PSX displays

```
CLEAR RAM *
```

When the operation is complete, the PSX displays

```
CLEAR RAM
COMPLETE
```

Invert RAM

The Invert RAM option allows you to invert all RAM data. To return the data to its original state, perform a second Invert RAM operation. (This operation cannot be performed if Data Lock is On — see the "Set Data Lock" section on page 4-33 for information.)

1. Select **Set RAM Options**.
2. Select **Invert RAM**.
3. Press [ENTER] to start the operation. The PSX displays

```
INVERT RAM *
```

When the operation is complete, the PSX displays

```
INVERT RAM
COMPLETE
```

Set Word Order for 16-bit Devices (Low/high)

The Word Order option allows you to select the order that RAM data is transferred to, or from, 16-bit wide devices. The two available settings, Low/High and High/Low, are described below. (This operation cannot be performed if Data Lock is On — see the "Set Data Lock" section on page 4-33 for information.)

Note: This option is displayed when a module that supports 16-bit wide devices is installed.

Low/High — For a Copy From RAM operation, the first byte of data is transferred to the low byte of the device (D0 through D7). The second byte of data is transferred to the high byte of the device (D8 through D15). This alternating pattern continues until the selected range of programmer RAM is copied.

For a Load From Master operation, the process is reversed: the first low byte is transferred to the first RAM address and the first high byte is transferred to the second RAM address. This alternating pattern continues until the device data is loaded into programmer RAM.

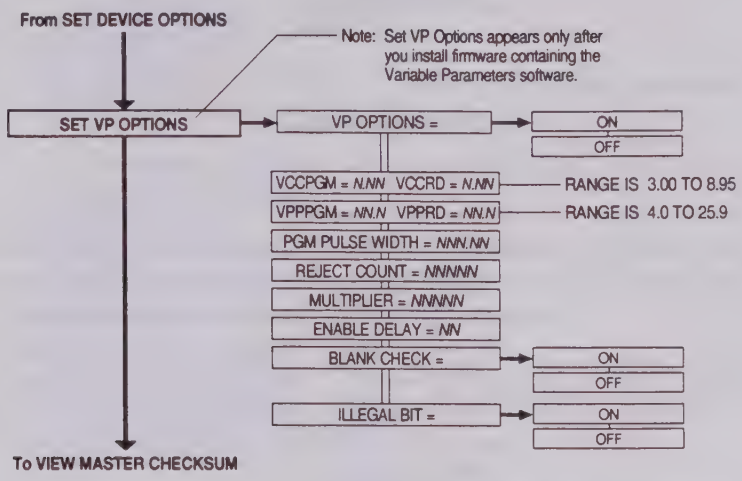
High/Low — For a Copy From RAM operation, the first byte of data is transferred to the high byte of the device (D8 through D15) and the second byte of data is transferred to the low byte of the device (D0 through D7). This alternating pattern continues until the selected range of programmer RAM is copied.

For a Load From Master operation, the process is reversed; the first high byte is transferred to the first RAM address and the first low byte is transferred to the second RAM address. This alternating pattern continues until the device data is loaded into programmer RAM.

1. Select **Set RAM Options**.
2. Select **Word Order**. The second line of the display shows the current word order selected.

   To change the current word order, press [ENTER]. The word order selection blinks.
3. Scroll to the desired word order setting.
4. Press [ENTER]. The second line of the display shows the selected word order setting.

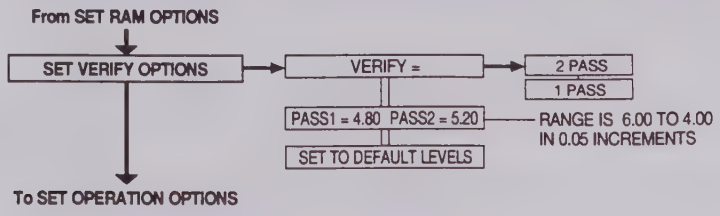
Set Variable Parameters Options



Variable Parameters enables you to modify algorithm-related parameters for programming devices that need more rigorous programming and/or verification.

The Set VP Options menu item is only present in the menu when firmware containing the Variable Parameters option is installed in the control module. Refer to the *Variable Parameters User Manual* (part number 096-0133) for information on how to use this menu option.

Set Verify Options



These options allow you to select either a 1 Pass or 2 Pass verify and the 2 Pass voltage levels. If a 1 Pass verify is selected, you can select a verify voltage or use the default level of 5.0V dc (usually the nominal operating voltage). If a 2 Pass verify is selected, the programmer checks the device(s) at the levels you have selected. The factory default levels are the high and low operating levels recommended by the manufacturer of the selected device. Use the following procedures to change the verify options.

Select Number of Verify Passes (2)

1. Select **Set Verify Options**.
2. Select **Verify =** . The second line of the display shows the current verify option selected.

   To change the setting, press ENTER . The currently selected option blinks.
3. Scroll to the desired setting.
4. Press ENTER . The second line of the display shows the selected setting.

Note: If a Pass1 or Pass2 verify option is selected, the verify voltage levels can be altered using the next procedure, "Select 1 Pass or 2 Pass Verify Voltage Levels."

Select 1 Pass or 2 Pass Verify Voltage Levels

(Manufacturer-recommended)

The verify voltage levels you set are used whenever a 1 Pass or 2 Pass verification is performed, regardless of the device type selected.

1. Select **Set Verify Options**.
2. Select **1 Pass = , 2 Pass =** . The second line of the display shows the current voltage levels for 1 Pass and 2 Pass.

   To change the voltage levels, press ENTER . The 1 Pass voltage level blinks.
3. Use the arrow keys to increase or decrease the voltage setting. The ^ key increases the voltage in .05V increments; the v key decreases the voltage in .05V decrements.

   To change the 2 Pass voltage, repeat steps 2 and 3. If you do not want to change a voltage, press ENTER to accept the currently displayed voltage.

Note: An asterisk at the left end of the second line of the display indicates that the verify voltages are not at their default values; double arrows (>) indicate that the verify voltages are at their default values.

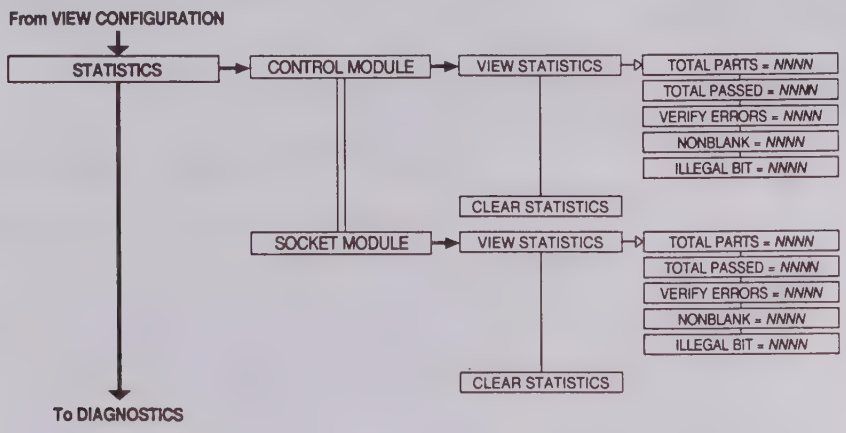
Set to Default Levels

This command sets the verify voltages to the factory defaults (see page C-4).

1. Select **Set Verify Options**.
2. Select **Set to Default Levels**. The PSX displays

   ```
   ENTER TO CONTINUE
   ```
3. Press ENTER to set verify voltages to default levels.

Statistics



This option allows you to view and clear the PSX control module and socket module statistics.

Control Module

View Statistics

Use the View Statistics command to view the following device statistics for the control module:

- Number of devices
- Number of devices successfully programmed
- Number of devices that did not verify
- Number of nonblank devices
- Number of devices that contained illegal bits

Select **View Statistics**. Use the arrow keys to scroll through the following displays:

```
TOTAL PARTS = NNNN
TOTAL PASSED = NNNN
VERIFY ERRORS = NNNN
NONBLANK = NNNN
ILLEGAL BIT = NNNN
```

Clear Statistics

Use the Clear Statistics command to clear the device statistics for the control module after processing each job. Statistics are not cleared on powerdown; they must be cleared by the operator. Statistics cannot be cleared when Data Lock is On (see the "Set Data Lock" section on page 4-33 for information). Use the following procedure to clear the cumulative device statistics for the control module:

1. Select **Clear Statistics**.
2. Press ENTER to clear the statistics.

View Socket Cycles

Use the View Socket Cycles command to view the following socket cycles statistics for the control module.

- The number of upper rail dial closures since the last reset.
- The number of lower rail dial closures since the last reset.
- The total number of upper rail dial closures (not resettable).
- The total number of lower rail dial closures (not resettable).

Note: The socket cycles statistics are a total of rail dial closures occurring on the control module. It is not specific to the rail(s) installed on the PSX.

Select View Socket Cycles. Use the arrow keys to scroll through the following displays:

```
Upper skt cycle = XX
Lower skt cycle = XX
Total upper = XX
Total lower = XX
```

Clear Socket Cycles

When the number of upper or lower rail dial closures equals the warrantied number for that socket (see the "Socket Warranty and Replacement" section on page D-2), the programmer displays the following message upon powerup:

```
Excessive socket cycles
ENTER to continue
```

We suggest that you replace the sockets at this interval. To order a socket replacement kit, contact your nearest Customer Support office. (See the "Socket Warranty and Replacement" section on page D-2 for a list of part numbers for available socket replacement kits.)

After installing the socket replacement kit, use the Clear Socket Cycles command to clear the number of upper and lower rail dial closures since the last reset. Statistics cannot be cleared when Data Lock is On (see the "Set Data Lock" section on page 4-33 for information). Use the following procedure to clear the resettable socket cycles for the control module:

1. Select Clear Socket Cycles (ENTER + ^).
2. Press ENTER to clear the number of socket cycles.

Socket Modules

View Statistics

Device statistics for each socket module are displayed separately.

Use the View Statistics command to view the following device statistics for the socket module:

- Number of devices
- Number of devices successfully programmed
- Number of devices that did not verify
- Number of nonblank devices
- Number of devices that contained illegal bits

Select **View Statistics**. Use the arrow keys to scroll through the following device statistics displays for each socket module:

```
TOTAL PARTS = NNNN
TOTAL PASSED = NNNN
VERIFY ERRORS = NNNN
NONBLANK = NNNN
ILLEGAL BIT = NNNN
```

Each module is identified by its position on the control module as follows:

Position Code	Definition
UL	Upper left
UR	Upper right
LL	Lower left
LR	Lower right

Use the View Statistics command to view the following device statistics for the socket modules:

- Number of devices
- Number of devices successfully programmed
- Number of devices that did not verify
- Number of nonblank devices
- Number of devices that contained illegal bits

Select View Statistics. Use the arrow keys to scroll through the following device statistics displays for each socket module:

```
Total parts = XX
Total passed = XX
Verify errors = XX
Nonblank = XX
Illegal bit = XX
```

Clear Statistics

Use the Clear Statistics command to clear the socket module device statistics on the installed socket module after processing each job. Statistics are not cleared on powerdown; they must be cleared by the operator. Statistics cannot be cleared when Data Lock is On (see the "Set Data Lock" section on page 4-33 for information). Use the following procedure to clear the cumulative device statistics for the socket modules:

1. Select **Clear Statistics.**
2. Press ENTER to clear the statistics.

View Socket Cycles

Statistics for each socket module are displayed separately. Each module is identified by its position on the control module as follows:

Position Code	Definition
UL	Upper left
UR	Upper right
LL	Lower left
LR	Lower right

Use the View Socket Cycles command to view the following socket cycle statistics for the socket modules.

- The number of rail dial closures for each socket module since the last reset.
- The total number of rail dial closures for each socket module (not resettable).

Select View Socket Cycles. Use the arrow keys to scroll through the following socket module statistics displays:

```
UL socket cycle = XXXX
UR socket cycle = XXXX
LR socket cycle = XXXX
LL socket cycle = XXXX
```

Clear Socket Cycles

When any of the socket module cycles equals the warrantied number for that socket (see the "Socket Warranty and Replacement" section on page D-2), the programmer displays the following message upon powerup:

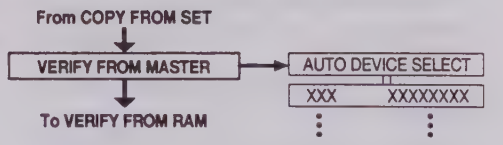
```
Excessive socket cycles
ENTER to continue
```

We suggest that you replace the sockets at this interval. To order a socket replacement kit, contact your nearest Customer Support office as listed in the Preface. (See the "Socket Warranty and Replacement" section on page D-2 for a list of part numbers for available socket replacement kits.)

After installing the socket replacement kit, use the Clear Socket Cycles command to clear the number of rail dial closures for each installed socket module since the last reset. Statistics cannot be cleared when Data Lock is On (see the "Set Data Lock" section on page 4-33 for information). Use the following procedure to clear the resettable socket cycles statistics for the socket modules:

1. Select Clear Socket Cycles (ENTER + ^).
2. Press ENTER to clear the statistics.

Verify From Master



After the PSX has performed a Copy From Master operation, use **Verify From Master** to check that the data was transferred correctly. A Verify From Master operation compares the device data with that of the master device to make sure they match.

The programmer can perform a 1 Pass or 2 Pass verify. Both verify operations test the device(s) at the level selected with the Set Verify Options menu. The factory default levels are the high and low operating levels recommended by the manufacturer of the selected device. To set the number of passes and/or verify voltage levels, select the Set Verify Options menu.

Note: If you are verifying devices that were just programmed, leave the devices in the sockets and perform the following procedure.

If the devices you want to verify are not installed, make sure the dial is in the open position and the device sockets are empty before performing the following procedure.

1. Select **Verify From Master**.
2. Select the manufacturer and device. If the rails or modules installed on the PSX support more than one package, the PSX displays a submenu of available socket modules. Select the module that supports the package you want to verify. The programmer displays

   ```
   INSERT DEVICES
   CLOSE DIAL TO VERIFY
   ```

   The second line of the display blinks.
3. Insert the master device in the master socket.

   For parallel rail programming, install the master device in either of the two master sockets. For alternate rail programming, install a master device in each master socket.
4. If the devices to be verified are not in the sockets, insert them.

5. Turn the dial(s) to the closed/start position to process devices. The PSX displays

```
VERIFYING DEVICES *
```

When processing is complete, the LED below each socket illuminates. If there are no failures, the programmer displays

```
VERIFY COMPLETE - OKAY
CHECKSUM=XXXX
```

where XXXX represents the checksum of the data.

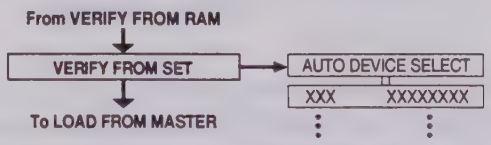
If there are failures, the programmer displays

```
VERIFY COMPLETE - ERRORS
```

and ERRORS is blinking. See "Reading LED Status Indicators" on page 3-17 for information on how to scroll through the messages and read the LEDs.

6. Turn the dial(s) to the open position.
7. Remove the programmed devices.

Verify From RAM



Use the **Verify From RAM** command to verify that the data in the programmed device(s) matches the data in programmer RAM.

1. Select **Verify From RAM**.
2. Select the manufacturer and device. If the rails or modules installed on the PSX support more than one package, the PSX displays a submenu of available socket modules. Select the module that supports the package you want to verify. The PSX displays

   ```
   INSERT DEVICES
   CLOSE DIAL TO VERIFY
   ```

   The second line of the display blinks.
3. Insert the devices to be verified into the sockets.

   For parallel rail programming, install devices in both rails. For alternate rail programming, install devices in the rail indicated by the arrows on the second line of the display.
4. Lock the devices into sockets and Turn the dial(s) to the closed/start position to process devices. The PSX displays

   ```
   VERIFYING DEVICES *
   ```

   When verifying is complete, the LED below each socket illuminates. If there are no failures, the PSX displays

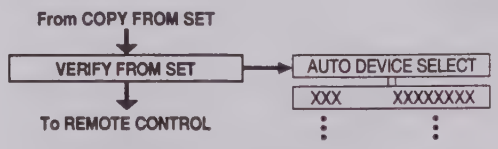
   ```
   VERIFY COMPLETE - OKAY
   CHECKSUM=XXXX
   ```

   where *XXXX* represents the checksum of the data. If there are failures, the PSX displays

   ```
   VERIFY COMPLETE - ERRORS
   ```

   with ERRORS blinking and the LED below each socket illuminates (see page 3-17 for an explanation of the LED color).
5. Turn the dial(s) to the open position.
6. Remove the verified devices.

Verify From Set



Use the **Verify From Set** command to verify that the data in the programmed set(s) of devices matches the data in programmer RAM. Because each device of the set was programmed with different data, make sure each device to be verified is inserted into a socket that corresponds to the same block of RAM data with which the device was programmed. For example, if the setsize is 4, the first device of the set (originally programmed in socket 1) could be verified in socket 1 or socket 5.

1. Select **Verify From Set**. Make sure that setsize and bitsize, which are displayed on the top line of the display, are set correctly. To change the setsize or bitsize, press [EXIT] and select the Set Operation Options menu.

2. Select the manufacturer and device. If the rails or modules installed on the PSX support more than one package, the PSX displays a submenu of available socket modules. Select the module that supports the package you want to verify. The PSX displays

   ```
   INSERT DEVICE SET
   CLOSE DIAL TO VERIFY
   ```

   The second line of the display blinks.

3. Insert the devices to be verified into the sockets. Multiple sets can be verified with one Verify From Set operation by installing more than one set of devices in the rail/module.

   For parallel rail programming, install devices in both rails. For alternate rail programming, install devices in the rail indicated by the arrows on the second line of the display.

4. Turn the dial(s) to the closed/start position to process devices.

   The PSX displays

   ```
   VERIFYING SETS *
   ```

   When processing is complete, the LED below each socket illuminates. If there are no failures, the PSX displays

   ```
   VERIFY COMPLETE - OKAY
   CHECKSUM=XXXX
   ```

   where XXXX represents the checksum of the data.

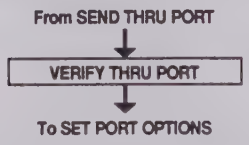
   If there are failures, the PSX displays

   ```
   VERIFY COMPLETE - ERRORS
   CHECKSUM=****
   ```

   with ERRORS blinking, and the LED below each socket illuminates (see page 3-17 for an explanation of the LED color).

5. Turn the dial(s) to the open position.
6. Remove the verified devices.

Verify Thru Port



The **Verify Thru Port** command uses an I/O port to verify that programmer RAM data matches the host data.

1. Select **Verify Thru Port**. The PSX displays

   ```
   VRFY ACTIVE_PORT FORMAT
   ENTER TO START
   ```

   The first line of the display shows the current port and translation format. The second line of the display blinks.

   To change the current port and translation format, go to the Set Port Options or Set I/O Options menus to change the parameters.

2. Press ENTER. The PSX displays

   ```
   VERIFYING THRU PORT *
   ```

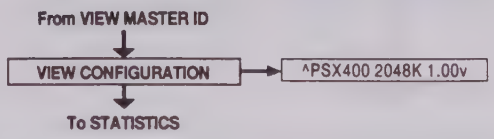
3. When the Verify Thru Port procedure is complete, the PSX displays

   ```
   VERIFY PORT COMPLETE
   CHECKSUM=XXXX
   ```

   where XXXX represents the checksum of the data.

   If a problem occurs during any part of the operation, the programmer stops and displays a message. (See Chapter 6, "Messages," for an explanation.)

View Configuration



The **View Configuration** command displays the programmer's model number, RAM size, software version number, and the type of module installed (if applicable). These are things you need to know when contacting Customer Support concerning your equipment.

1. Select **View Configuration**. The second line of the display shows the current system configuration:

   ```
   VIEW CONFIGURATION
   PSXXXXX YYYYYK N.NN zz
   ```

   where PSXXXXX is the model number, YYYYYK is the amount of installed RAM, N.NN is the version of the installed software, and zz is blank or VP for Variable Parameters.

2. Press [v] once to display the installed rail types.

3. If one or two Memory Rails are installed, and socket modules are installed on the Memory Rail, press [v] again to display the installed socket module type(s). Each module is identified by its position on the control module as follows:

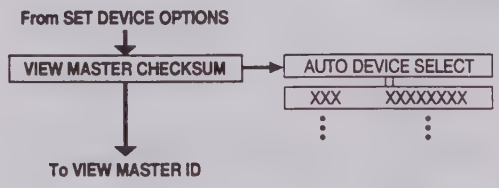
Position Code	Definition
UL	Upper left
UR	Upper right
LL	Lower left
LR	Lower right

For example:

```
VIEW CONFIGURATION
PSX1000 16384K 4.00
```

indicates the system is a PSX1000 with 16 MB of RAM and running version 4.00 firmware.

View Master Checksum



The **View Master Checksum** command calculates and displays the master device's checksum. Use the following procedure to view the checksum of the master device.

Note: View Master Checksum is disabled for microcontrollers when Micro modules are installed.

1. Select **View Master Checksum**. The PSX displays the last device selected.

   To change the device, press [ENTER] .

2. Scroll to the desired manufacturer. Press [ENTER] .

3. Scroll to the desired device. Press [ENTER] .

4. The PSX displays

   ```
   INSERT MASTER
   ENTER TO VIEW
   ```

   The second line of the display blinks.

5. Insert the master device into the master socket (make sure the device is properly locked in the socket) or socket 1 of the upper rail (if using a non-DIP master device).

6. Press [ENTER] to begin the operation. While the calculation is being done, the PSX displays

   ```
   READING FROM MASTER *
   ```

   ```
   VIEW COMPLETE - OKAY
   CHECKSUM=XXXX
   ```

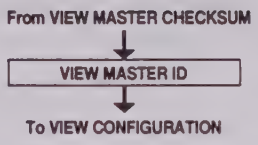
   where *XXXX* represents the checksum of the data.

   If a problem occurs during any part of the operation, the programmer stops and displays a message. (See Chapter 6, "Messages," for an explanation.)

7. Lift the socket lever and remove the master device from the master socket or from socket 1.

8. If you want to read the checksum of another device with the same manufacturer and part number, press [ENTER] twice and return to step 4.

View Master ID



The **View Master ID** command reads and displays the electronic ID (if a valid ID is present), the manufacturer, and part number for the device installed in socket 1. Use the following procedure to view the ID of the master device.

1. Select **View Master ID**. The PSX displays

   ```
   INSERT MASTER
   ENTER TO VIEW
   ```

   The second line of the display blinks.

2. Insert the device into the master socket (make sure the device is properly locked in the socket).

3. Press ENTER to begin the operation. When the ID has been read, the PSX displays

   ```
   MASTER ID = XX XX
   MANUFACTURER, PART_NUMBER
   ```

   or

   ```
   MASTER ID = XXXX XXXX
   MANUFACTURER, PART_NUMBER
   ```

   where *XX XX* or *XXXX XXXX* is the ID read. A 4-digit ID is read for an 8-bit wide device and an 8-digit ID is read for a 16-bit wide device. The second line of the display shows the device's manufacturer and part number.

4. Unlock and remove the device from the socket.

5. If you want to read the electronic ID of another device, press ENTER and repeat steps 2 through 4.

Translation Formats

The following translation formats are available for downloading data from a PC to the PSX. For additional information about translation formats, refer to the "Set Port Options" command on page 4-31 and to the "Translation Formats" Application Note.

Format	Displayed Name	Code
ASCII-B10F	B10F STX/NOSTX	03
ASCII-BHLF	BHLF STX/NOSTX	02
ASCII-BNPF	BNPF STX/NOSTX	01
ASCII-Octal Apostrophe	OCTAL APOST	32
ASCII-Octal Percent	OCTAL PC STX/SOH	31
ASCII-Octal SMS	OCTAL SMS	37
ASCII-Octal Space	OCTAL SP STX/SOH	30
ASCII-Hex Apostrophe	HEX APOST	52
ASCII-Hex Comma	HEX COM STX/SOH	53
ASCII-Hex Percent	HEX PC STX/SOH	51
ASCII-Hex SMS	HEX SMS	57
ASCII-Hex Space	HEX SP STX/SOH	50
Binary	BINARY	10
DEC Binary	DEC BINARY	11
Fairchild Fairbug	FAIRCHILD	80
5-level BNPF	5-BNPF STX/NOSTX	08
Hewlett-Packard 64000 Absolute	HP64000	89
Hewlett-Packard UNIX Format	HP UX	96
Intel Hex-32	INTEL HEX-32	99
Intel Intellec 8/MDS	INTEL MDS	83
Intel MCS-86 Hex Object	INTEL MCS	88
Intel OMF286	INTEL 286	98
Intel OMF386	INTEL 386	97
MOS Technology	MOS TECH	81
Motorola 32-bit (S3 record)	MOTOROLA S3	95
Motorola EXORciser	MOTOR EXORCI	82
Motorola EXORmacs	MOTOR EXORMA	87
RCA Cosmac	RCA COSMAC	70
Signetics Absolute Object	SIGNETICS	85
Spectrum	SPECT STX/NOSTX	12
Tektronix Hexadecimal	TEX HEX	86
Tektronix Hexadecimal Extended	TEX HEX EXTD	94
Texas Instruments SDSMAC	TI SDSMAC	90

Application Notes

The following Application Notes are available from your nearest Customer Support office as listed in Appendix A.

Computer Remote Control (CRC) — 983-0486 Describes how to set up the RS-232C and IEEE-488 ports for use with a host computer and software driver; describes the CRC commands that are available for the PSX parallel programmers.

Translation Formats — 983-0487 Describes translation formats and how to use them.

Set and Gang Programming — 983-0505 Describes how to use set programming and gang programming.

Address Offset — 983-0506 Describes how to use the I/O address offset.

PSX1000 and PSX500

Parallel Programmers

User Notes — Version 3.4

DATA I/O

984-1023-008

Discontinued Device Support

Programming support for the following devices has been temporarily discontinued to allow for algorithm review.

Manufacturer	Part Number	Family Code	Pinout Code
Bosch	27C64	195	033
	27C128	195	051
	27C256	195	F32
	27C510*	215	18D
	27C512	195	0A4
	27C010*	196	0CB
Philips Components	87C654**	F8B	073
SEEQ Technology, Inc.	28C101*	FB8	110
Waferscale Integration, Inc.	27C040L*	164	0F6
Xicor, Inc.	M28C010	198	110

* *DIP and 40-pin rail devices.*
** *DIP and micro rail devices.*

Updated Device Support

The programming algorithms for the devices listed below have been updated since the last release. The algorithms were updated for one or more of the following reasons:

- A change in the specification issued by the semiconductor company
- An improvement in the programming algorithm to increase programming yields and/or to increase speed.

Manufacturer	Part Number	Old Family/ Pinout Code	New Family/ Pinout Code
Advanced Micro Devices/MMI	29F010-EC	23A/339	2FD/339
Cypress Semiconductor, Inc.	27C256	2EB/F32	2F7/3C1
Intel Corporation	28F200BX-B	404/20A	2F8/20A
	28F200BX-T	400/206	2F9/206
	28F400BX-B	404/407	2F8/407
	28F400BX-T	400/406	2F9/406
	28F010*†	186/118	2F3/3BC
	28F010-F	186/B18	2F3/3BD
	28F010-R	186/C18	2F3/3BE
	28F020*	186/170	2F3/3B4

* *40-pin rail, DIP, and 32PLCC (32) devices*
† *32SOIC device*

New Device Support

The following devices have been added to the PSX programmers since the last release:

Manufacturer	Part Number	Family Code	Pinout Code
New DIP Devices			
Atmel Corporation	27C516	141	3D4
	27C4096	2BB	207
	28C64B	0BA	0A6
Bosch	CC460	3C2	3B2
Fujitsu Microelectronics Inc.	29F040	23A	1EA
	29F040A	23A	1EA
Intel Corporation	87BC5PG	1B8	1D0
	87BC6QG	1B8	1D6
Macronix Inc.	28F1000	2F6	3D3
Mitsubishi	37782ECTFP	D8F	3B6
	37783ETFP	D8F	3B7
	37794E3T	C8F	3BA
National Semiconductor, Inc.	27C240	F5F	089
New 28-pin Rail Devices			
Atmel Corporation	28HC191	0D2	01C
	28C64B	0BA	0A6
Ricoh Corporation	687C64	0D9	029
New 40-pin Rail Devices			
Atmel Corporation	27C516	141	3D4
Hitachi, Ltd.	58V001	2E6	37D
Intel Corporation	87BC5PG	1B8	1D0
	87BC6QG	1B8	1D6
NEC Electronics	77P25	126	1AC
New 32PLCC(28) Devices			
Atmel Corporation	28C64B	0BA	0A6
New 32PLCC(32) Devices			
Fujitsu Microelectronics Inc.	29F040	23A	1EA
	29F040A	23A	1EA
Texas Instruments	28F010A	2F3	3BC
	28F010B	2F3	3BC
	28F020	2F3	3B4

Manufacturer	Part Number	Family Code	Pinout Code
New 44PLCC Devices			
Atmel Corporation	27C516	141	3D4
	27C4096	2BB	207
National Semiconductor	27C240	F5F	089
New 32TSOP Devices			
Macronix Inc.	27C1000-TS	D5C	2EF
Texas Instruments	28F010A-F	2F3	3BD
New 48TSOP Devices			
Advanced Micro Devices/MMI	29F100B-E	2FA	3C7
	29F100T-E	2FC	3C7
	29F200B-E	2FA	3C9
	29F200T-E	2FC	3C9
	29F400B-E	2FA	3CB
	29F400T-E	2FC	3CB
New 56TSOP Devices			
Intel Corporation	E28F016SA	2FB	3C5
	E28F016SV	2FB	3C5
	E28F032SA	2FB	3C6
	E28F200BV-B	2F8	3CF
	E28F200BV-T	2F9	3CF
	E28F200BX-B	2F8	3CF
	E28F200BX-T	2F9	3CF
	E28F400BV-B	2F8	3D0
	E28F400BV-T	2F9	3D0
	E28F400BX-B	2F8	3D0
	E28F400BX-T	2F9	3D0

Manufacturer	Part Number	Family Code	Pinout Code
New 68Card Devices			
AMP Incorporated	797263-1	208	371
	797263-2	208	2D8
	797263-3	208	3CD
	797263-4	208	2D7
	797263-5	208	3CE
	797262-1	2F1	3A7
	797262-2	2F1	3A8
	797262-3	2F1	3A9
	797262-7	29E	130
	1-797078-2	29E	130
	797172-8	29E	41A
	1-797078-3	29E	41A
	1-797078-5	29E	41B
Epson America, Inc.	LWB065SX20	2A8	369
	WWB065SX20	2A8	369
	LWB065SX40	2C4	369
	WWB065SX40	2C4	369
	LWB129SX20	2A8	2E6
	WWB129SX20	2A8	2E6
	LWB129SX40	2C4	2E6
	WWB129SX40	2C4	2E6
	LWB257SX20	2A8	2E3
	WWB257SX20	2A8	2E3
	LWB257SX40	2C4	2E3
	WWB257SX40	2C4	2E3
	LWB513SX20	2A8	2DC
	WWB513SX20	2A8	2DC
	LWB513SX40	2C4	2DC
	WWB513SX40	2C4	2DC
	LWB101SX20	2A8	130
	WWB101SX20	2A8	130
	LWB101SX40	2C4	130
	WWB101SX40	2C4	130
	LWB201SX20	2A8	41A
	WWB201SX20	2A8	41A
	LWB201SX40	2C4	41A
	WWB201SX40	2C4	41A
	BWB101SDY0	2F5	3B5
	HWB257ESX0	2A6	2E3
	HWB257ESY0	29E	2E3
	HWB513ESX0	2A6	2DC
	HWB513ESY0	29E	2DC
	HWB101ESX0	2A6	130
	HWB101ESY0	29E	130
	HWB201ESX0	2A6	41A
	HWB201ESY0	29E	41A
	HWB401ESX0	2A6	41B
	HWB401ESY0	29E	41B

Continuity Testing Added

Support for continuity testing has been added for the following devices:

- AMD 27C010, 27C020, 27C040, and 27C4096
- Atmel 27C010
- Hitachi 27256
- Intel 28F010 and 28F400BX-B
- Macronix 27C1000
- Philips 87C654
- Texas Instruments 28F010A and 28F010B

Installing Your Update

To install a new version of system software, see the "Update Firmware or RAM Upgrade Installation" section in the current *PSX1000 and PSX500 User Manual.*

5 Troubleshooting

This chapter describes how to solve problems you may encounter during both operation and diagnostic tests. It also includes a "Diagnostics" section that gives detailed explanations of the diagnostic tests available on the PSX in the **Diagnostics** menu and a "Theory of Operation" section with block diagrams of the various circuits in the PSX components.

CAUTION: Assembling or disassembling the PSX (including removing or installing a rails and socket modules) when power is applied to the PSX can damage it and the socket module and voids the warranty.

Common Problems

Several problems are listed below with some suggestions for correcting them. Customer Support numbers are listed in Appendix A.

- **Programmer does not power up.**

  The most likely cause of the problem is the CPU board. The next most likely cause is the power supply (see the "Calibration" section on page D-24 for calibration instructions).

  If the problem persists, contact your nearest Customer Support office.

- **Module LEDs turn on and stay lit during powerup.**

  The problem may be a mis-seated module. Turn off the PSX, remove the module, and reinstall the module.
  (See "Installing Socket Modules" on page 2-5.)

  If the LEDs stay illuminated during powerup, contact your nearest Customer Support office.

- **The PSX is unable to copy from RAM and displays:**

  ```
  PROGRAM FAIL
  ```

  If this problem occurs continuously for various devices, the most likely cause of the problem is the CPU board. The next most likely cause of the problem is the logic board.

  If this problem occurs intermittently or with only certain devices, contact your nearest Customer Support office.

- **Rail LEDs turn on and stay lit during powerup.**

  The problem may be a mis-seated rail. Turn off the programmer and remove the rail (see the "Disassembling the PSX" section on page 7-3). Then reinstall the rail (see the "Installing Rail(s)" section on page 2-2). If the rail LEDs still illuminate and stay illuminated during power up, contact your nearest Customer Support office.

- **Only one socket fails to program.**

  The problem may be a mis-seated socket module. Turn off the programmer and remove the module (see the "Disassembling the PSX" section on page 7-3) and check the connector for bent pins. If none of the pins are bent, reinstall the module on the rail (see the "Installing Socket Modules" section on page 2-5).

  If one socket of the module still fails to program, turn off the programmer and move each socket module to the opposite side of the rail. If the problem follows the module, suspect the daughterboards or mother board in the module. If the problem stays on the same side of the rail, suspect the Memory rail driver board.

- **The PSX displays black bars.**

  Turn the display adjustment (see page 3-2) until the display is clear.

- **The PSX does not communicate with the PC.**

  Make sure the I/O cables are connected correctly. Refer to Chapter 2 and Appendix B for more information.

Diagnostics

The Diagnostics menu offers several diagnostic tests for the PSX to ensure the integrity of its operation. If you have any problems running a test or desire additional information about diagnostic tests, do the following:

- For information on how to use the scrolling menus, refer to "Using the Display, Keyboard, and Menus" on page 3-2.
- For information on what tests are available and how to run a test, see "Diagnostics" on page 4-10.
- If the programmer displays a message after performing any of these tests, see Chapter 6, "Messages," for an explanation of the messages encountered.
- For further details, call your nearest Customer Support office as listed in Appendix A.

Note: Diagnostics cannot be performed if Data Lock is On (see the "Set Data Lock" section on page 4-33 for information).

Note: When different rail types are installed, the programmer prompts for the rail you want to run the test on. If only one rail type is installed, the test is performed automatically for the installed rail(s).

Note: For accurate Memory rail diagnostics, install memory rails that each have two DIP48 socket modules installed.

Each diagnostic test is explained in the following sections.

Full System Test

CPU analog system, DRAM, I/O, and rails

The Full System Test sequentially loops through the CPU Test, Rail Test, and Interface Board Test described below. The number of passes and failures is displayed.

CPU Test

CPU analog system

When power is initially applied to the system, the CPU Test performs a check of the static RAM, CPU functions, keyboard/display, firmware, checksum, and EEPROM test. The CPU Test continuously loops through checks of all system references, all REF and RAW voltages, and autocalibration. The number of passes and failures is displayed.

Rail Test

All installed rails

The Rail Test continuously tests all socket latches and readback and verify circuits, address counters and routers, device detection circuits, and the state machine circuit. The number of passes and failures is displayed.

Socket TTL Test

TTL level stimulus at rail sockets

Note: When different rail types are installed, the programmer prompts for the rail you want to run the Socket TTL Test on. If only one rail type is installed, the test is performed automatically for the installed rail(s).

Note: For accurate Memory rail diagnostics, use two memory rails that each have two DIP48 socket modules installed.

Memory rail

The Memory rail Socket TTL Test causes the digital pin drivers to cycle high and low from pin 1 through pin 48 (see Figure 5-1). Pin 24 is ground.

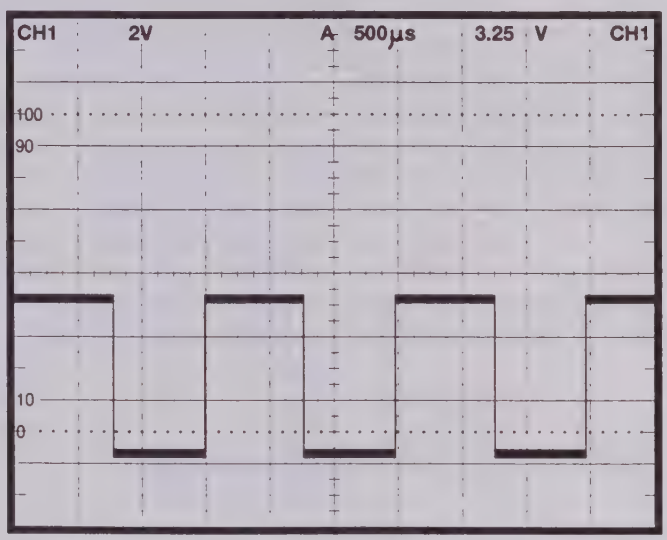


Figure 5-1
Memory Rail
Socket TTL Test Waveform for Programming Socket Pins 1 through 48

Micro and 40-pin rail

The Micro and 40-pin rail Socket TTL Test causes the digital pin drivers to cycle high and low from pin 1 through pin 40 (see Figure 5-2). Pin 20 is ground.

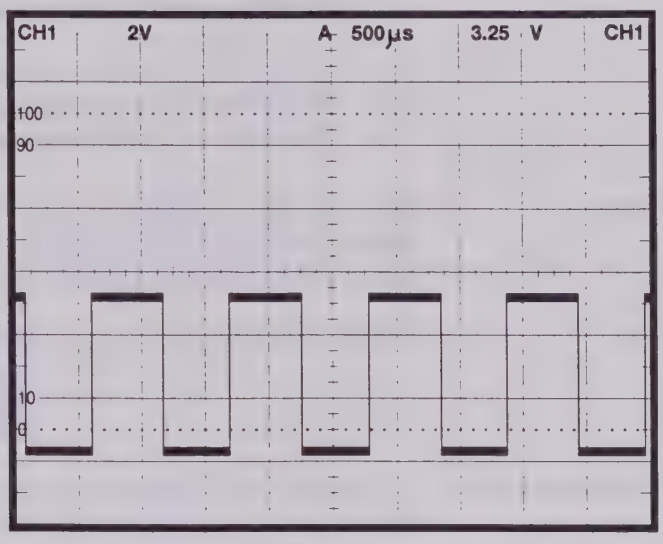


Figure 5-2
Micro and 40-pin Rail Socket TTL Test Waveform for Programming Socket Pins 1 through 40

28-pin rail

The 28-pin rail Socket TTL Test continuously sends a binary sequence to all of the non-power socket pins. The pattern is applied to the pins in eight-bit groups. Voltage levels on the pins should toggle between high and low at a rate determined by the position of the pin within the eight-pin group. The least significant bit (LSB) will toggle at the 1X rate, the LSB +1 at the 2X rate, the LSB +2 at the 3X rate, and so forth up to the most significant bit (MSB). The pins in each of the three non-power 8-pin groups and their relationship within the group (LSB to MSB) are shown below:

- Pins 11 (LSB), 12, 13, 15, 16, 17, 18, 19 (MSB)
- Pins 10 (LSB), 9, 8, 7, 6, 5, 4, 3 (MSB)
- Pins 25 (LSB), 24, 21, 2, 27, 20 (MSB)

Socket Voltage Test

Static voltage levels at rail sockets

Use a voltmeter to test the voltages on the specified socket pins.

Note: When different rail types are installed, the programmer prompts for the rail you want to run the Socket Voltage Test on. If only one rail type is installed, the test is performed automatically for the installed rail(s).

Note: For accurate Memory rail diagnostics, use two memory rails that each have two DIP48 socket modules installed.

Memory rail

The Memory rail Socket Voltage Test applies a constant voltage to the power circuits associated with each socket setting all of the socket pins low except for the following (pin 24 is ground):

Socket Pin No.	Voltage Range (V dc)		
3, 5, 11, 32, 34, 35, 43	14.25	–	15.75
25, 38, 42, 44	4.75	–	5.25

Micro and 40-pin rail

The Micro and 40-pin rail Socket Voltage Test sets all of the socket pins low except for the following (pin 20 is ground):

Socket Pin No.	Voltage Range (V dc)		
1, 7, 30	14.25	–	15.75
40	4.75	–	5.25

28-pin rail

The 28-pin rail Socket Voltage Test applies a constant voltage to the power circuits associated with each socket as follows (pin 14 is ground):

Socket Pin No.	Voltage Range (V dc)		
1, 22, 23	14.25	–	15.75
26, 28	4.75	–	5.25

CPU board — If any of the above socket voltages are not within the specified range, you can test the voltages at the CPU board test points (TP) listed below. See Figure 5-3 for the location of test points on the CPU board. Test point 1 (TP1) is ground.

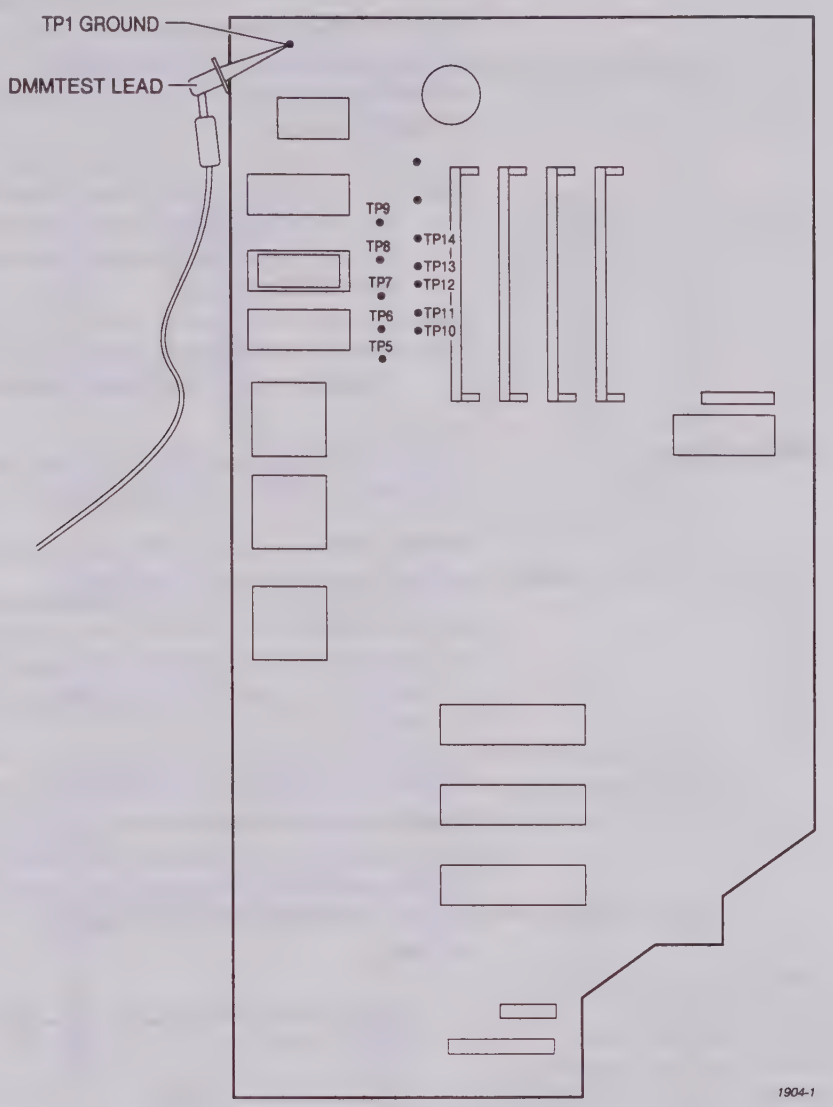


Figure 5-3
CPU Test Points for Socket Voltage Test

Note: The following readings apply only when no rails are installed.

CPU Board Test Point	Voltage Range (V dc)		
5, 6, 7	14.94	–	18.26
8, 9	5.94	–	7.26
10, 11, 13	14.25	–	15.75
12, 14	4.75	–	5.25

Socket Driver Test

Analog waveforms at rail sockets

Use a scope to view the waveforms on the specified socket pins. Have a 512Ω resistor handy for viewing the waveforms on the Micro and 40-pin rail master socket pins 1, 5, 26, and 28. Use a voltmeter to test the voltages on the Micro and 40-pin rail master socket pins 36 and 40.

Note: When different rail types are installed, the programmer prompts for the rail you want to run the Socket Driver Test on. If only one rail type is installed, the test is performed automatically for the installed rail(s).

Note: For accurate Memory rail diagnostics, use two memory rails that each have two DIP48 socket modules installed.

Memory rail

The Memory rail Socket Driver Test sets all of the socket pins low except for the following (pin 15, 24, or 34 is ground):

Socket Pins 3, 5, 7, 9, 11, 32, 34, 35, and 43

The test ramps the digital to analog converter (DAC) up to approximately 25V, turns off and on the reference switch, turns off and on the high voltage pin router, and turns off DACs (see Figure 5-4 or Figure 5-5, depending on the version of the rail you are using).

Master Socket Pins 34, 35, and 43

The test ramps the digital to analog converter (DAC) up to approximately 25V, turns off and on the reference switch, turns off and on the high voltage pin router, and turns off DACs (see Figure 5-4 or Figure 5-5, depending on the version of the rail you are using).

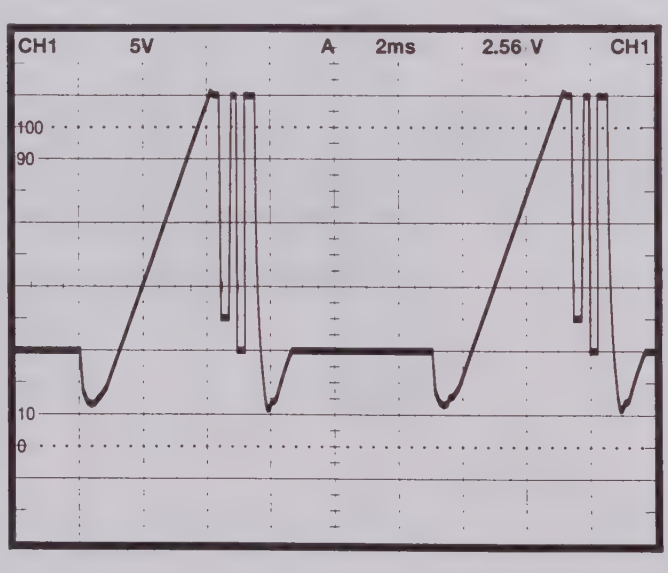
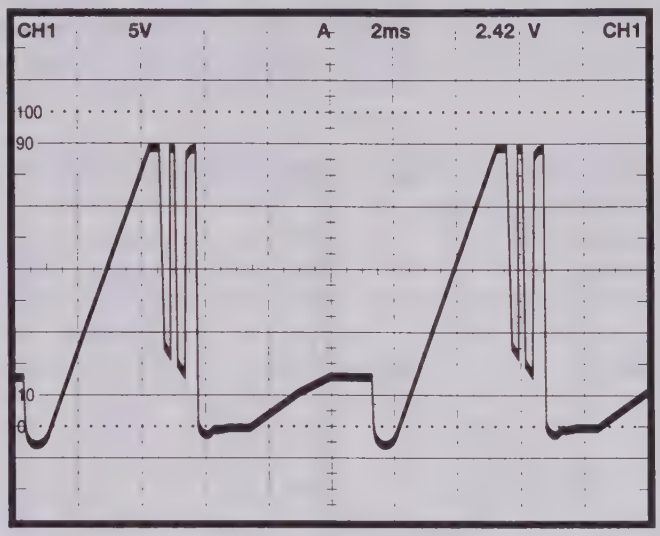


Figure 5-4
*Memory Rail (P/N **950-0151-001**)*
Socket Driver Test Waveform for Programming Socket Pins 3, 5, 7, 9, 11, 32, 34, 35, and 43; and for Master Socket Pins 34, 35, and 43

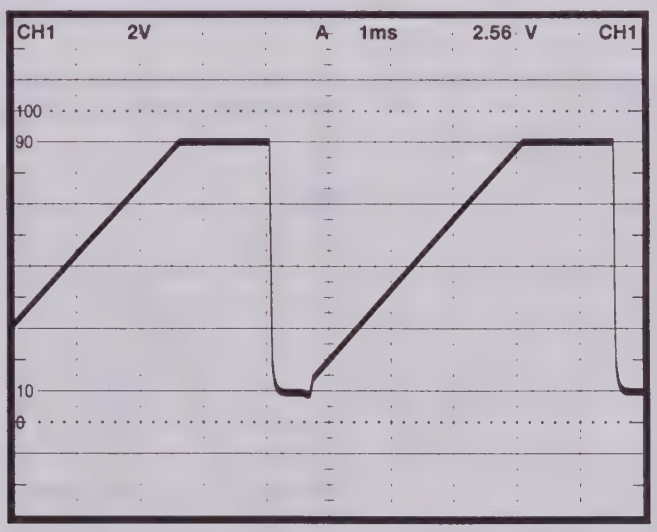
Figure 5-5
Memory Rail (P/N ***950-0151-002*** *and higher) Socket Driver Test Waveform for Programming Socket Pins 3, 5, 7, 9, 11, 32, 34, 35, and 43; and for Master Socket Pins 34, 35, and 43*



Socket Pins 25, 38, 40, 42, and 44

The test ramps the digital to analog converter (DAC) up to approximately 8V, turns off and on the reference switch, turns off and on the high voltage pin router, and turns off DACs (see Figure 5-6).

Figure 5-6
Memory Rail Socket Driver Test Waveform for Programming Socket Pins 25, 38, 40, 42, and 44



Micro and 40-pin rail

The Micro and 40-pin rail Socket Driver Test sets all of the socket pins low except for the following (pin 11 or 30 is ground):

Socket Pins 1, 5, 26, 28, 31, and 38

The test ramps the digital to analog converter (DAC) up to approximately 25V, turns off and on the reference switch, turns off and on the high voltage pin router, and turns off DACs (see Figure 5-7).

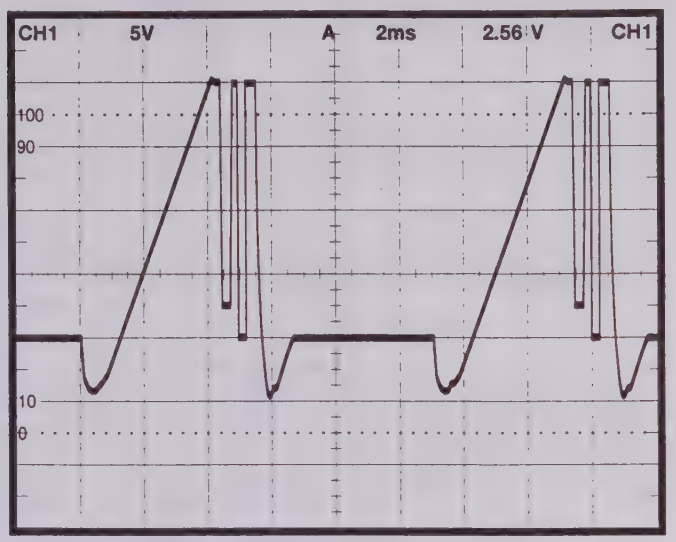


Figure 5-7
Micro and 40-pin Rail Socket Driver Test Waveform for Programming Socket Pins 1, 5, 26, 28, 31, and 38

Socket Pin 7

The test ramps the DAC up to approximately 21V, turns off and on the high voltage pin router, and turns off DACs (see Figure 5-8).

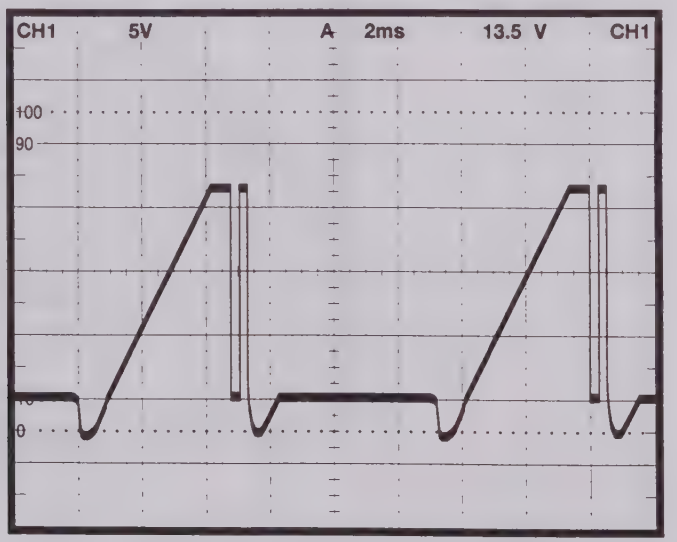
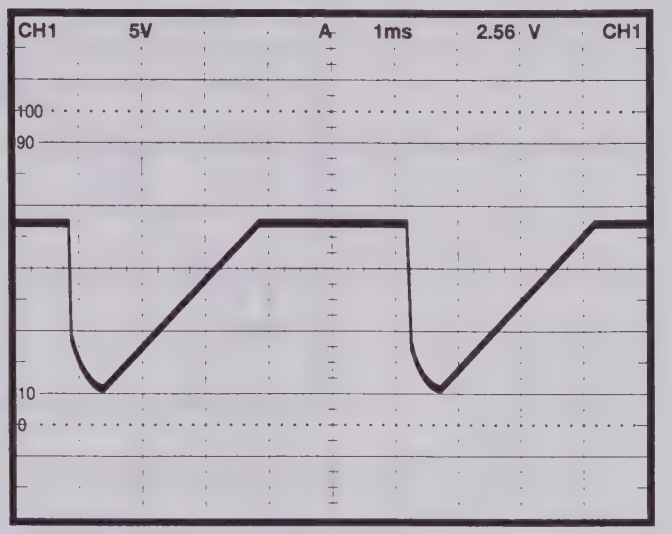


Figure 5-8
Micro and 40-pin Rail Socket Driver Test Waveform for Programming and Master Socket Pin 7

Socket Pin 20

The test ramps the DAC up to approximately 21V (the high voltage pin router clamps the output to 14.5V), turns off and on the high voltage pin router, and turns off DACs (see Figure 5-9).

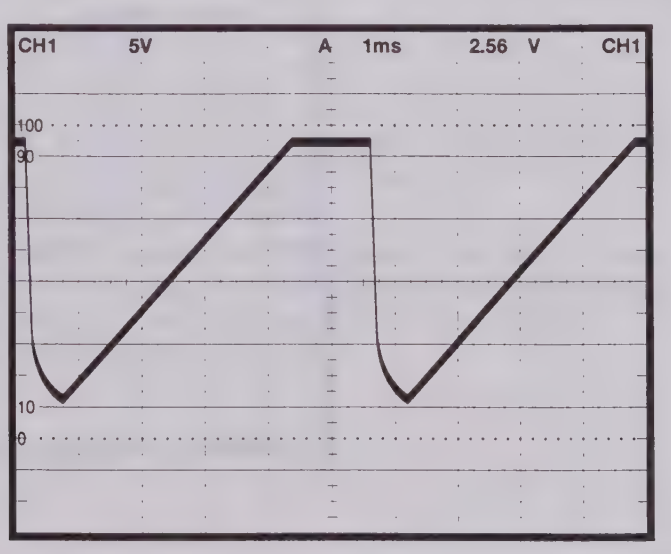
Figure 5-9
Micro and 40-pin Rail Socket Driver Test Waveform for Programming Socket Pin 20



Socket Pin 25

The test ramps the DAC up to approximately 21V, turns off and on the high voltage pin router, and turns off DACs (see Figure 5-10).

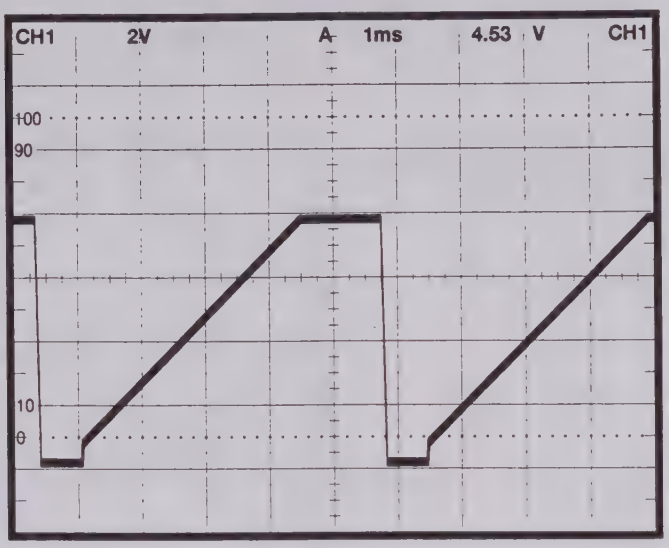
Figure 5-10
Micro and 40-pin Rail Socket Driver Test Waveform for Programming Socket Pin 25



Socket Pins 36 and 40

The test ramps the DAC up to approximately 8V and turns off DACs (see Figure 5-11).

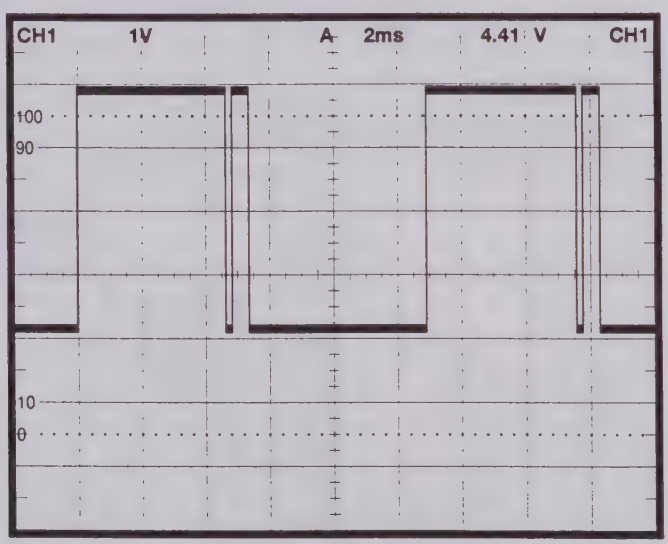
Figure 5-11
Micro and 40-pin Rail Socket Driver Test Waveform for Programming Socket Pins 36 and 40



Master Socket Pins 1, 5, 26, and 28

Connect a 512Ω resistor between the pin being tested and ground (pin 11 or 30) before checking the waveform. The test turns the high voltage pin router on and off, and on and off (see Figure 5-12).

Figure 5-12
Micro and 40-pin Rail Socket Driver Test Waveform for Master Socket Pins 1, 5, 26, and 28



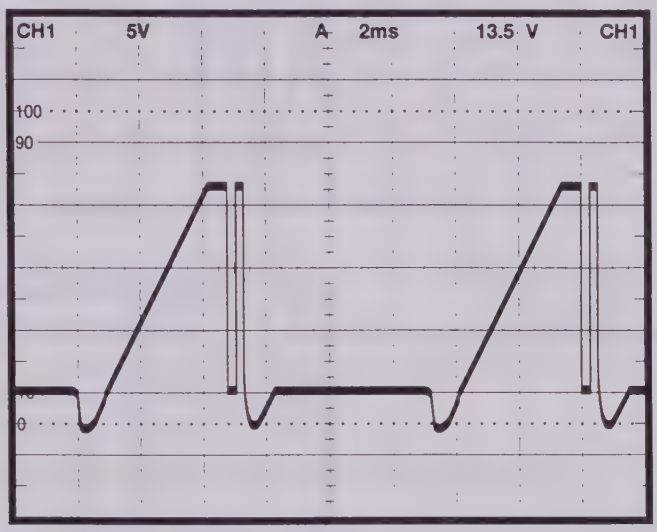
Master Socket Pin 7

The test ramps the DAC up to approximately 21V, turns off and on the high voltage pin router and turns off DACs (see Figure 5-8).

Master Socket Pin 31

The test ramps the DAC up to approximately 21V, turns off and on the high voltage pin router, and turns off DACs (see Figure 5-13).

Figure 5-13
Micro and 40-pin Rail Socket Driver Test Waveform for Master Socket Pin 31



Master Socket Pins 36 and 40

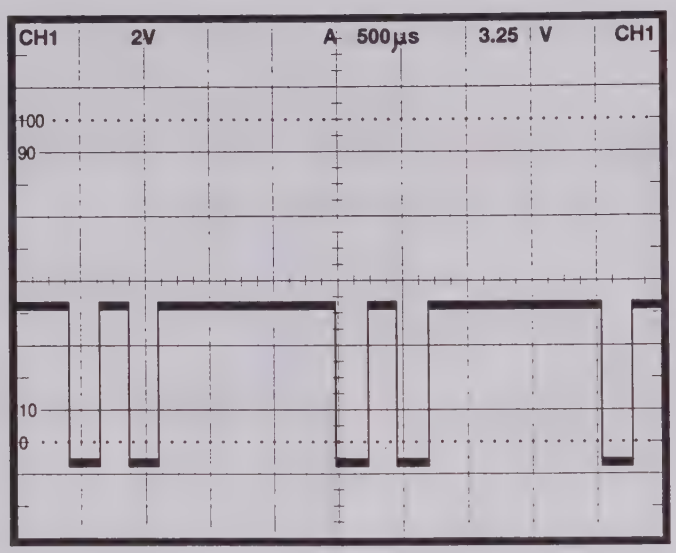
These pins should read between 4.75 and 5.25V dc.

28-pin rail

The 28-pin rail Socket Driver Test continuously loops the waveform test patterns shown in Figures 5-14 through 5-16 on the VCC power socket pins (pins 26 and 28) and the VPP power socket pins (pins 1, 22, and 23).

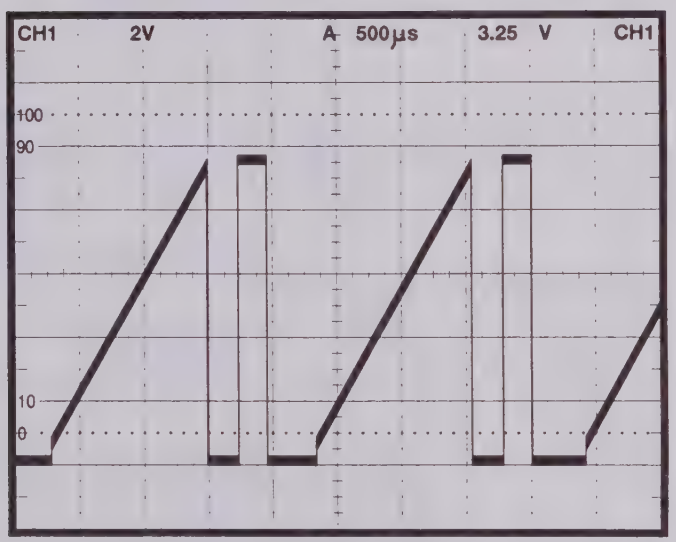
Figure 5-14 shows the VCC waveforms on the master socket and Figure 5-15 shows the VCC waveforms on the programming socket. Figure 5-16 shows the VPP waveforms on the programming socket.

Figure 5-14
28-pin Rail Socket Driver Test Waveform for Master Socket Pins 26 and 28 (VCC)



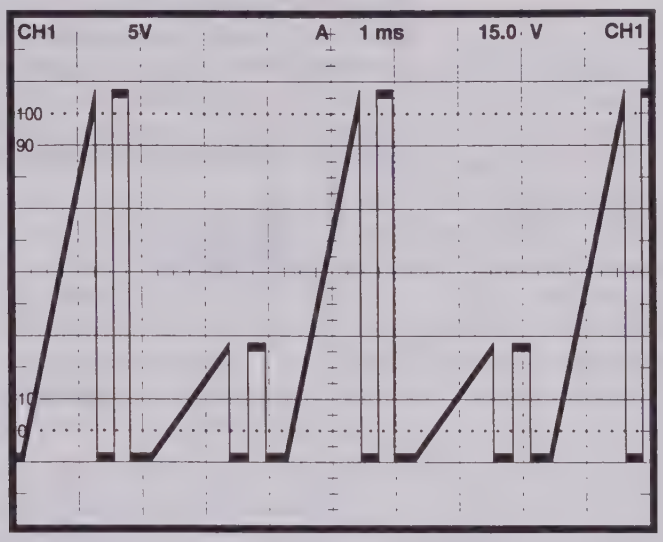
1906-1

Figure 5-15
28-pin Rail Socket Driver Test Waveform for Programming Socket Pins 26 and 28 (VCC)



1907-1

Figure 5-16
28-pin Rail Socket Driver Test Waveform for Programming Socket Pins 1, 22, and 23 (V_{PP})



Socket LED Test

LED test on installed rails

The Socket LED Test applies a continuous pattern to the socket LEDs. The pattern illuminates all sockets in sequence, first as red, then as yellow, then green.

Waveform Observation

Enable/disable continuous device read/write mode

Enables or disables loops through a program or verify operation at the socket. Once enabled, the test performs a copy (write) or verify (read) command for the full address range. The Memory, Micro and 40-pin rail Waveform Observation test writes RAM data to the programming socket and FF to the master socket. The 28-pin rail Waveform Observation test alternately writes 55 and AA to the socket.

DRAM and I/O Test

RAM, serial, and parallel ports

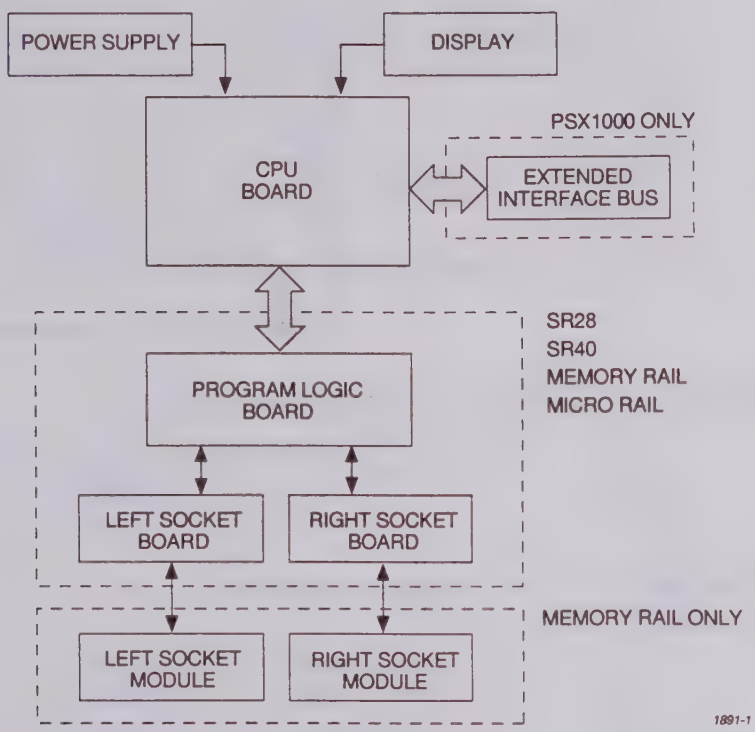
The test continuously performs dynamic RAM, serial and IEEE-488 port tests. The number of passes and failures is displayed. For dynamic RAM errors, the PSX briefly displays the logical RAM address and the bits in error.

Theory of Operation

This section lists the boards contained in the components of the PSX programmers and a general overview of how several of the commands work. Also included are block diagrams of the basic circuitry found on these boards.

Figure 5-17 shows a block diagram of the PSX system.

Figure 5-17
PSX System Block Diagram



List of Boards

- The PSX Control Module contains a CPU board, power supply, and display/keyboard assembly.
- The Memory rail contains a logic control board and left and right driver boards.
- Socket modules (used on the Memory rail only) each contain a socket board.
- The Micro and 40-pin rails contain a logic control board and left and right socket boards.
- The 28-pin rail contains a program logic board and left and right socket boards.

Operation

Copy From Master and Copy From RAM

After selecting **Copy From Master** or **Copy From RAM** from the front panel, you select a device. The CPU software reads the device and sets up the address router and the device testing circuitry. The address router controls the socket pin assignments. The device test circuitry tests for and disables sockets containing bad devices. The first address is written to and read from the master device or RAM. The address and data are then routed to the sockets where the data is written to the devices. If called for by the selected algorithm, a hardware byte verification is performed. Then, the address is increased by an increment of one and written to the master device or RAM so that the next byte of data can be read.

When the data in the last address of the master device or RAM has been written into the receiving device, the CPU begins an automatic verification procedure. The verification procedure checks the data in every master device or RAM address against the data in every corresponding device address either at the high and low voltages selected from the front panel or at the default settings.

Load Thru Port

After you select **Load Thru Port** from the front panel, the programmer enables the port selected in **Set Port Options: Active Port** and the translation format selected in **Set I/O Options: Format**. The first message is translated to read the address and data and to strip the control characters. The data is then written to RAM (data is not written directly from the port to a device). The second message is then translated and the procedure is repeated until the transmission is complete. **Load From Master** and **Load From Set** work similarly. Use **Copy From RAM** once data is loaded into RAM.

Block Diagrams

This section includes block diagrams of the major circuit boards contained in the components of the PSX programmers.

CPU Boards

Figure 5-18 shows a block diagram of the PSX1000 CPU board. Figure 5-19 shows a block diagram of the PSX500 CPU board.

Figure 5-18
PSX1000 CPU Board Block Diagram

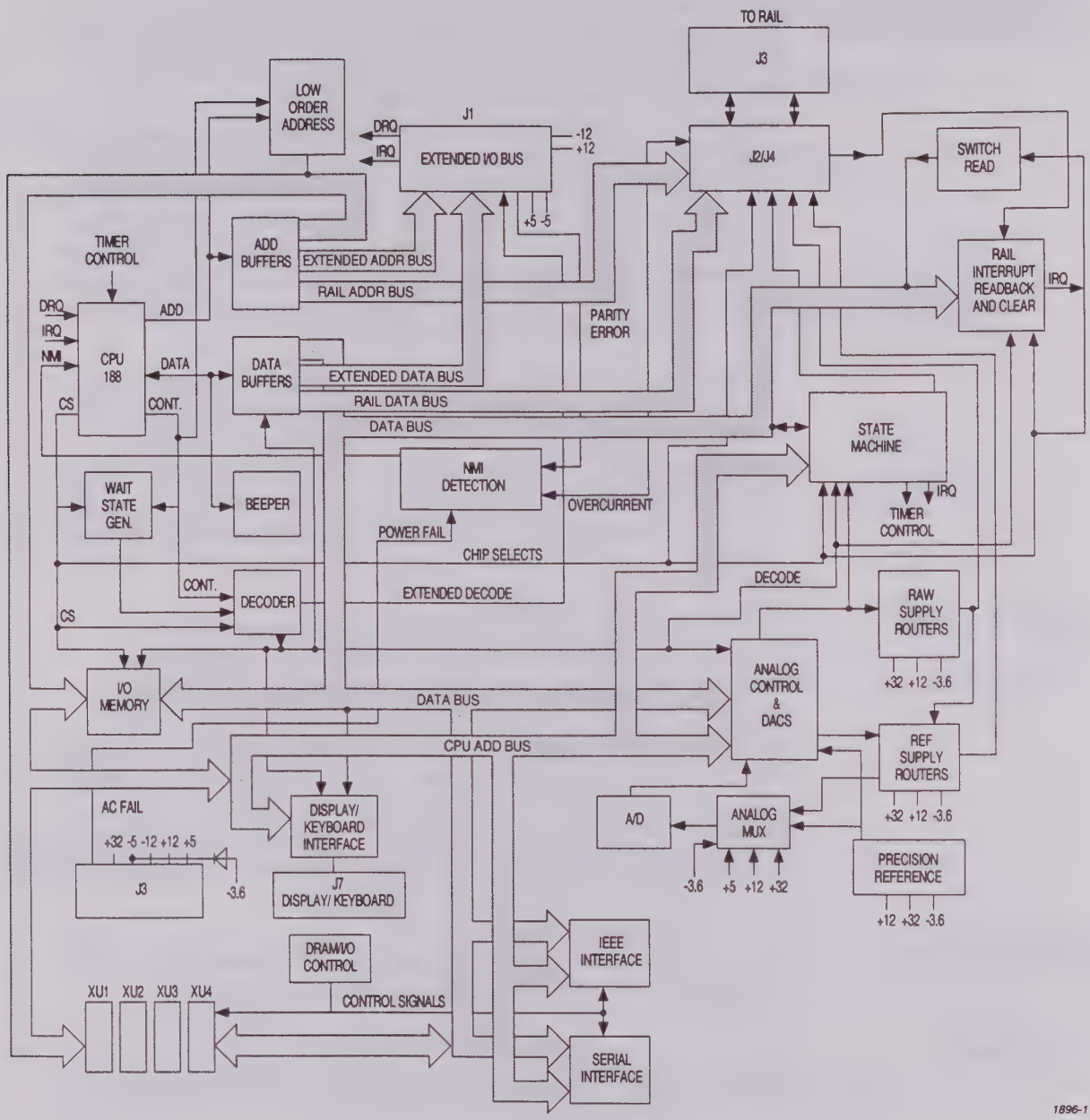
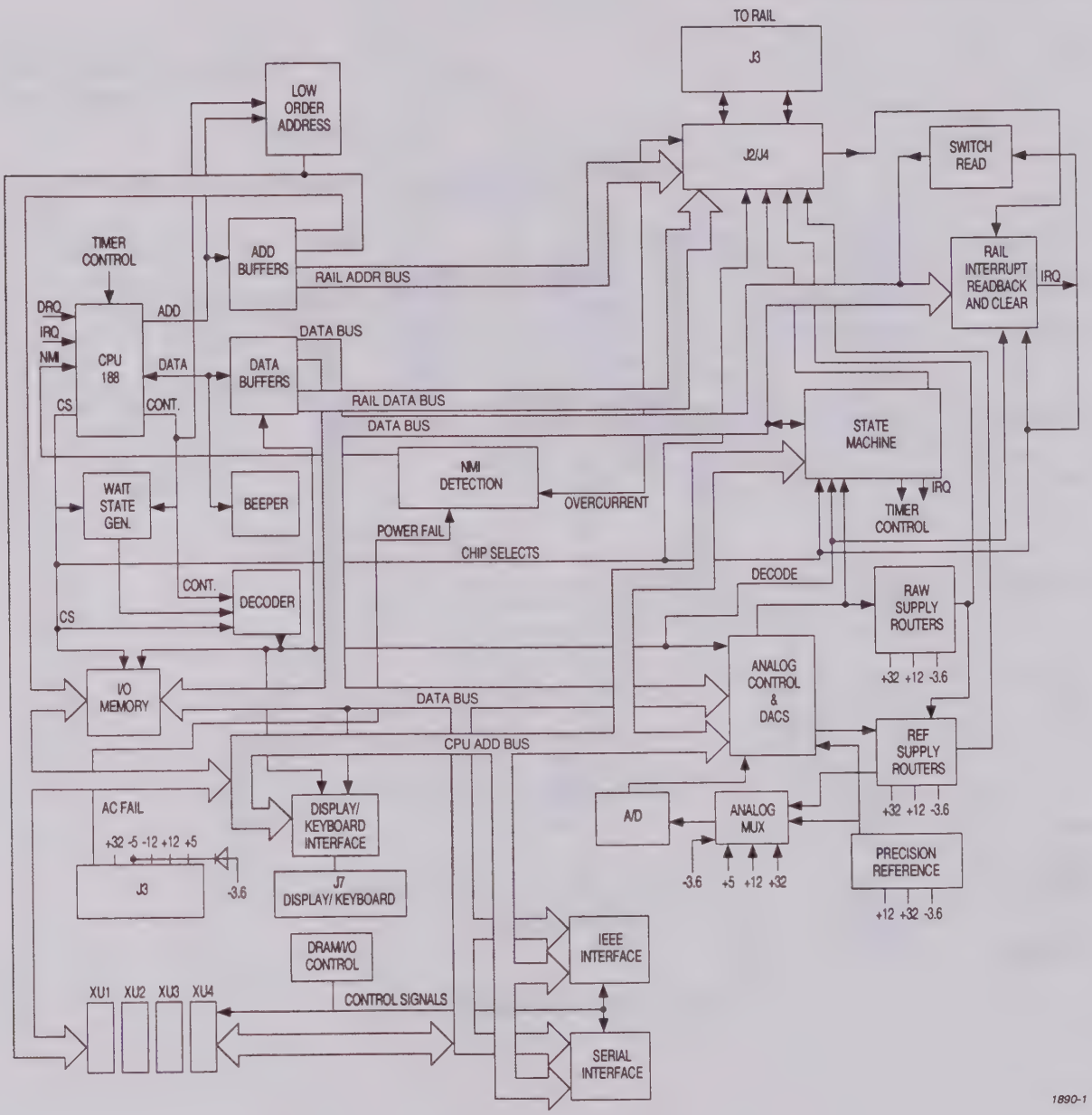


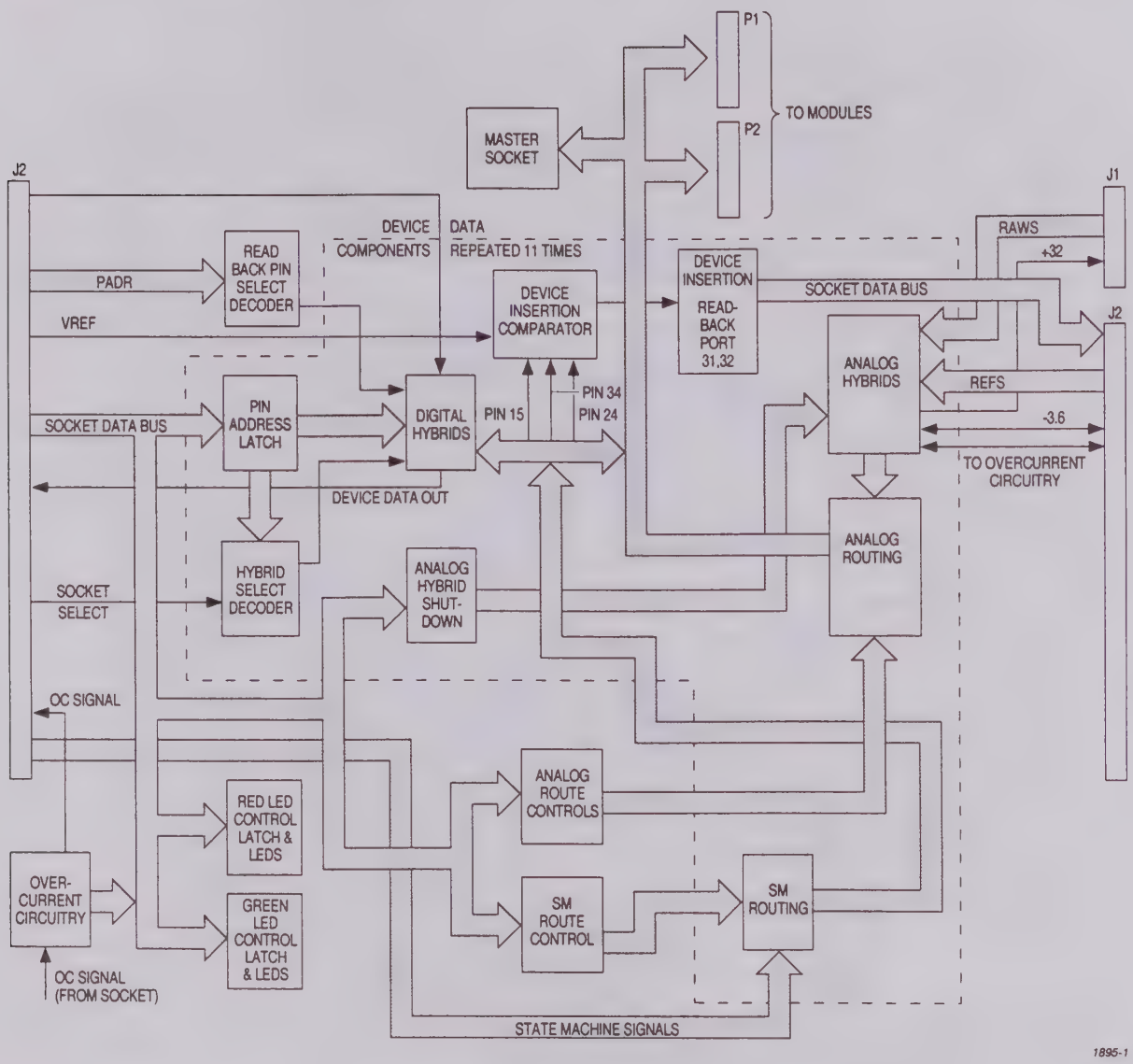
Figure 5-19
PSX500 CPU Board Block Diagram



Memory Rail Driver Board

Figure 5-20 shows a block diagram of the Memory rail driver board.

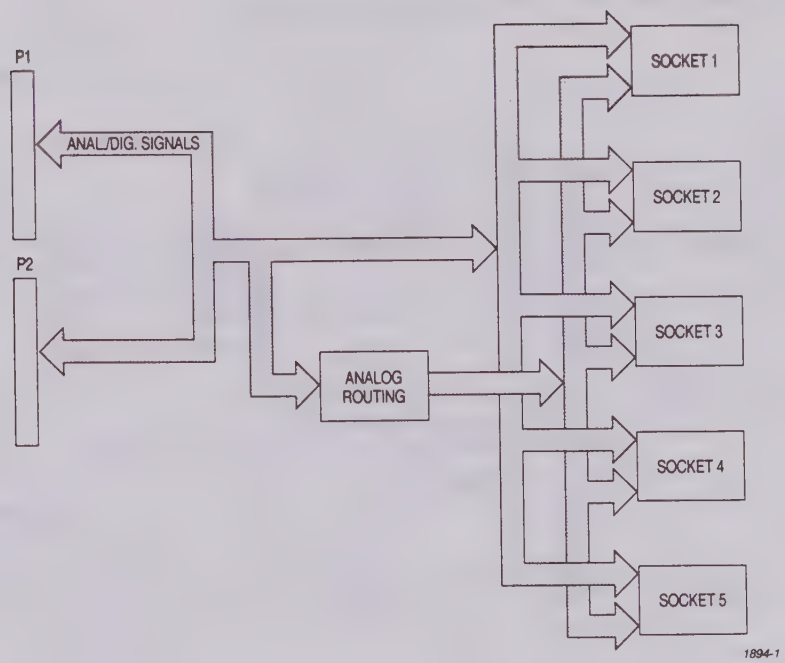
Figure 5-20
Memory Rail Driver Board Block Diagram



Socket Module Socket Board

Figure 5-21 shows a block diagram of a socket module socket board. Socket modules are used in conjunction with the Memory rail only.

Figure 5-21
Socket Modules Socket Board Block Diagram



Socket Boards

Figure 5-22 shows a block diagram of the Micro and 40-pin rail socket board. The left and right socket boards work as a single unit. The right socket board has a master socket, five programming sockets and their associated circuitry. The left socket board has five programming sockets.

Figure 5-22
Micro and 40-pin Rail Driver Board Block Diagram

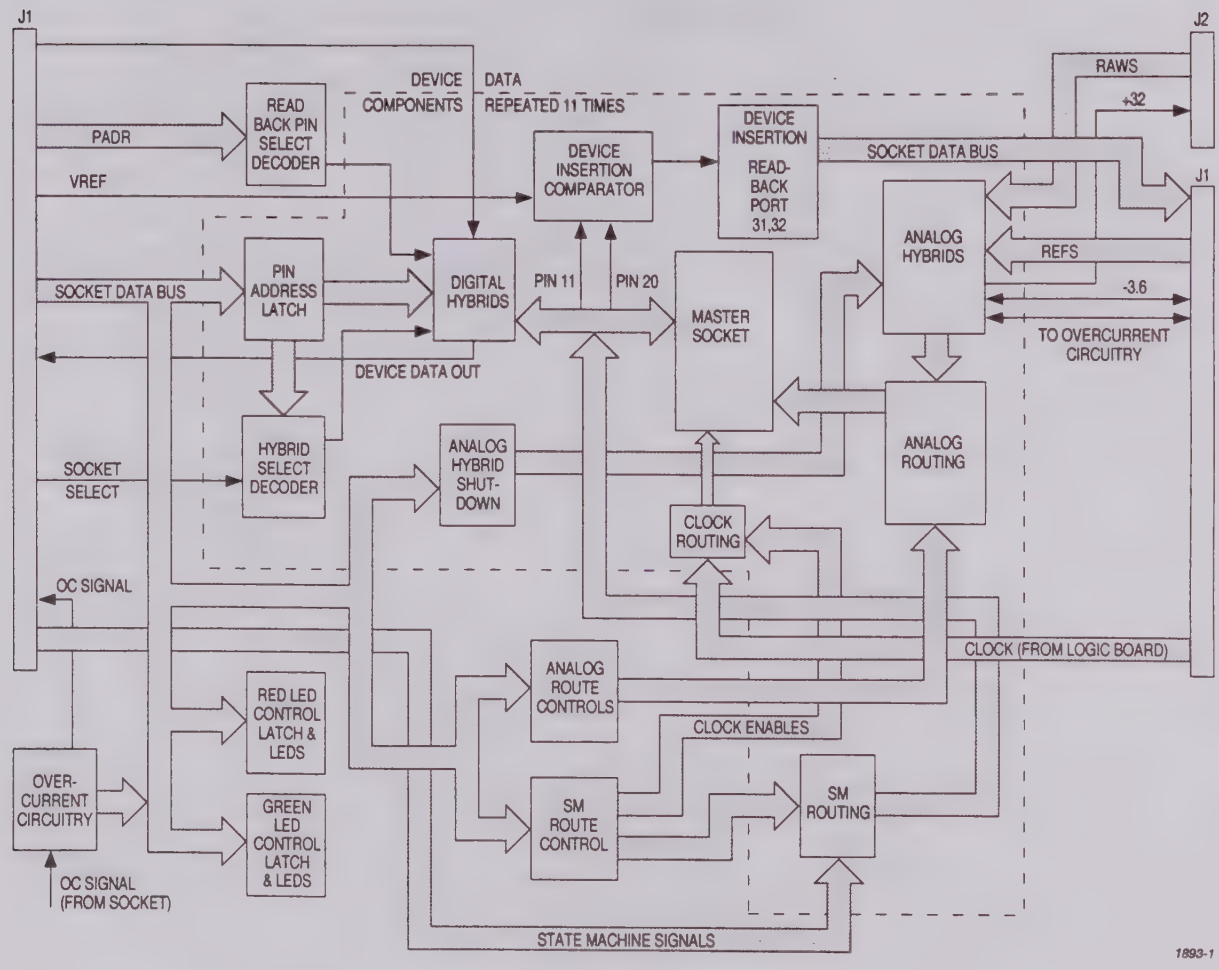
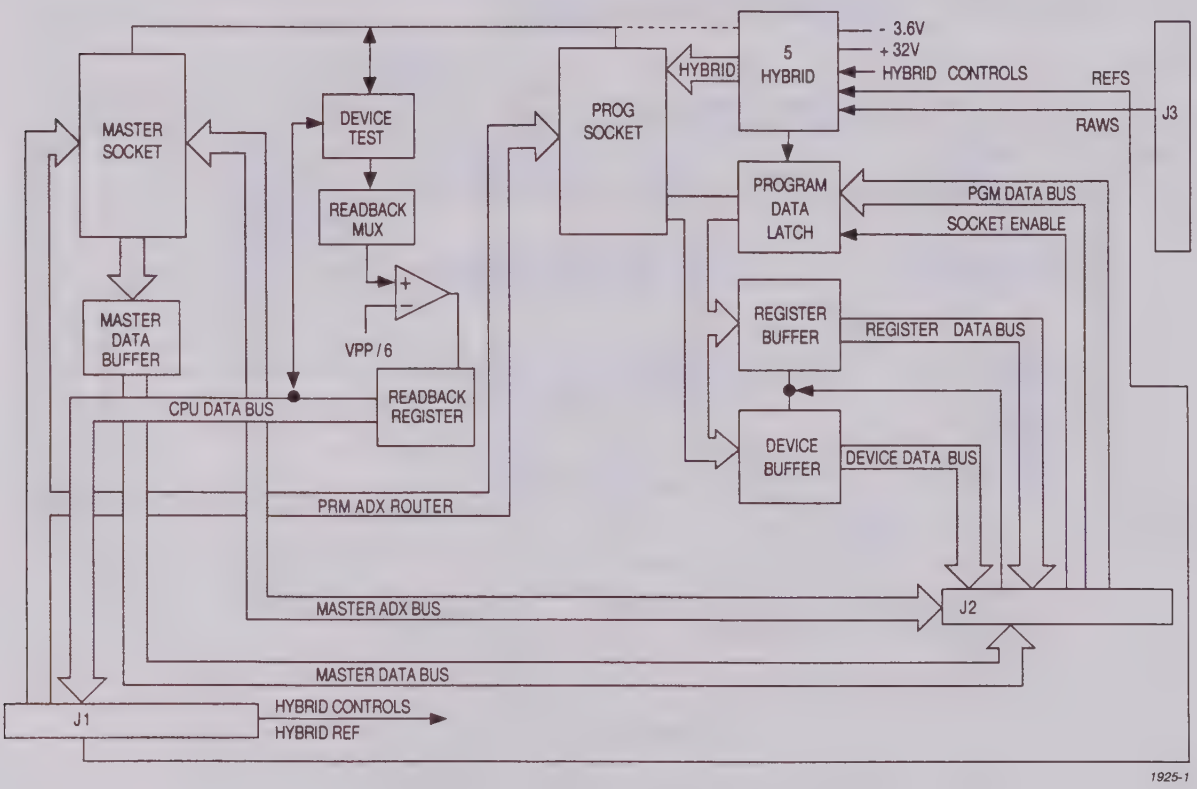


Figure 5-23 shows a block diagram of the 28-pin rail socket board. The left and right socket boards work as a single unit. The right socket board has a master socket, seven programming sockets and their associated circuitry. The left socket board has eight programming sockets.

Figure 5-23
28-pin Rail Socket Board Block Diagram



Logic Control Boards

Figure 5-24 shows a block diagram of the Memory and Micro rail logic control board. Figure 5-25 shows a block diagram of the 40-pin rail logic control board. Figure 5-26 shows the 28-pin rail program logic board.

Figure 5-24
Memory and Micro Rail Logic Control Board Block Diagram

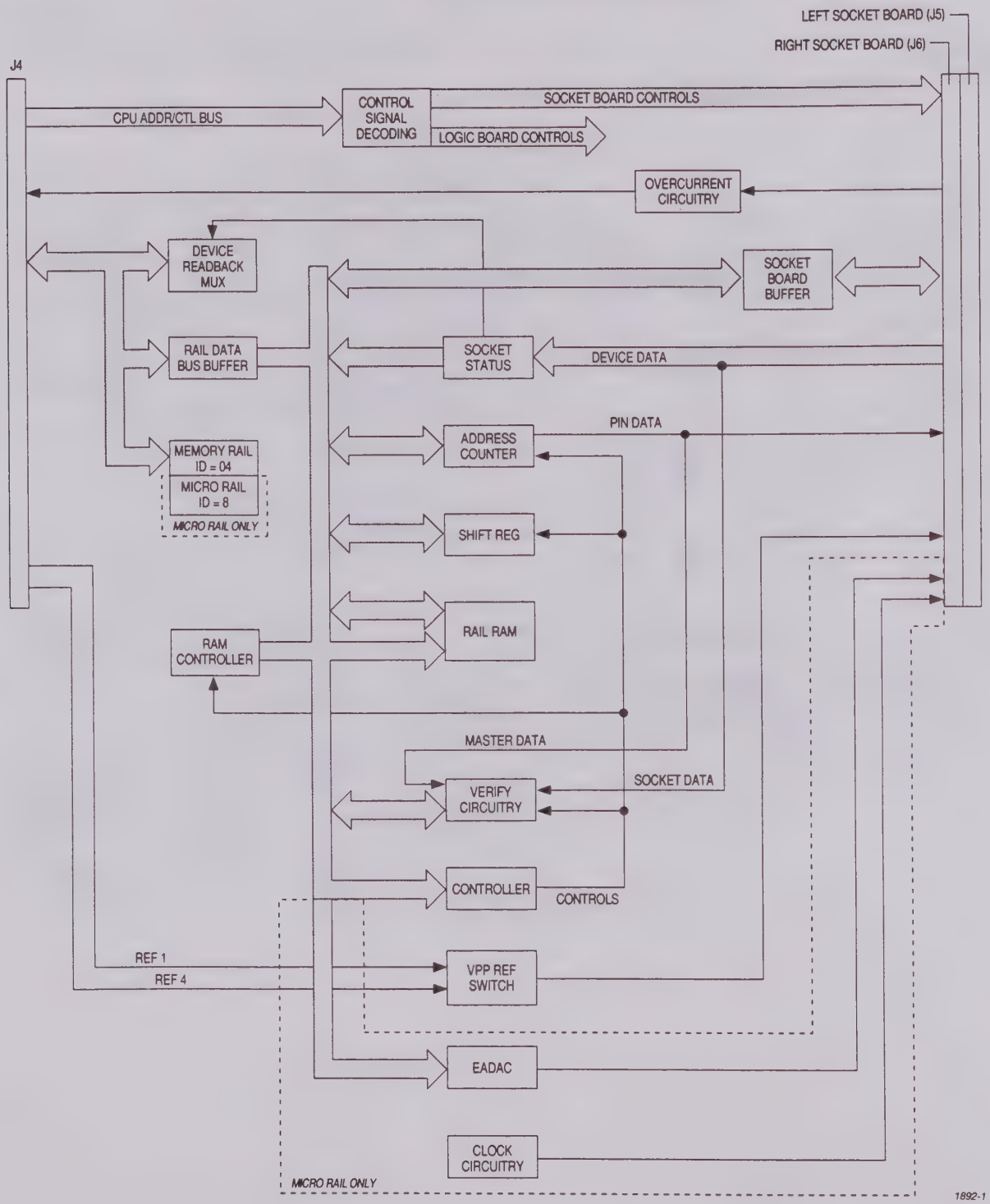


Figure 5-25
40-pin Rail Logic Control Board Block Diagram

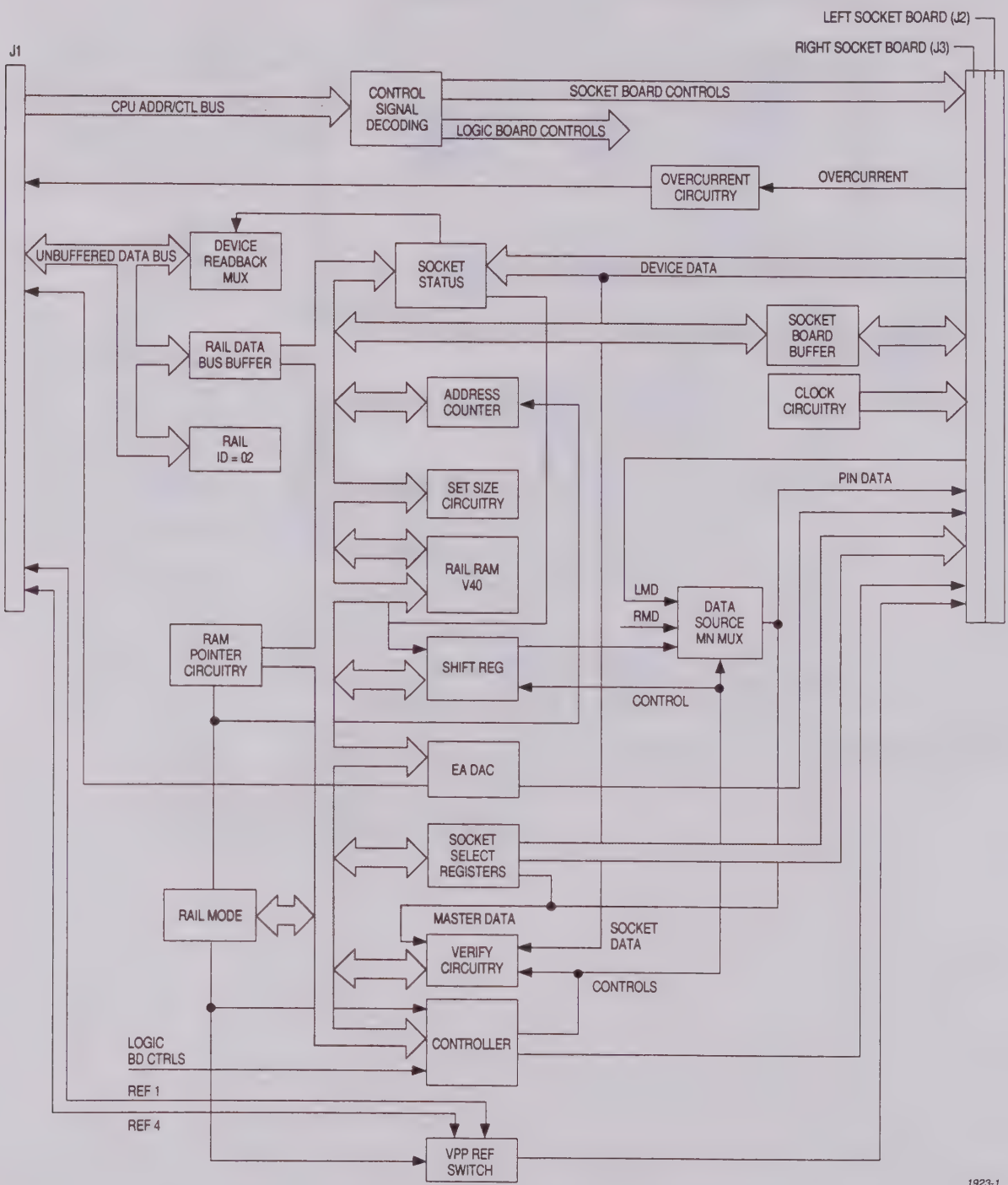
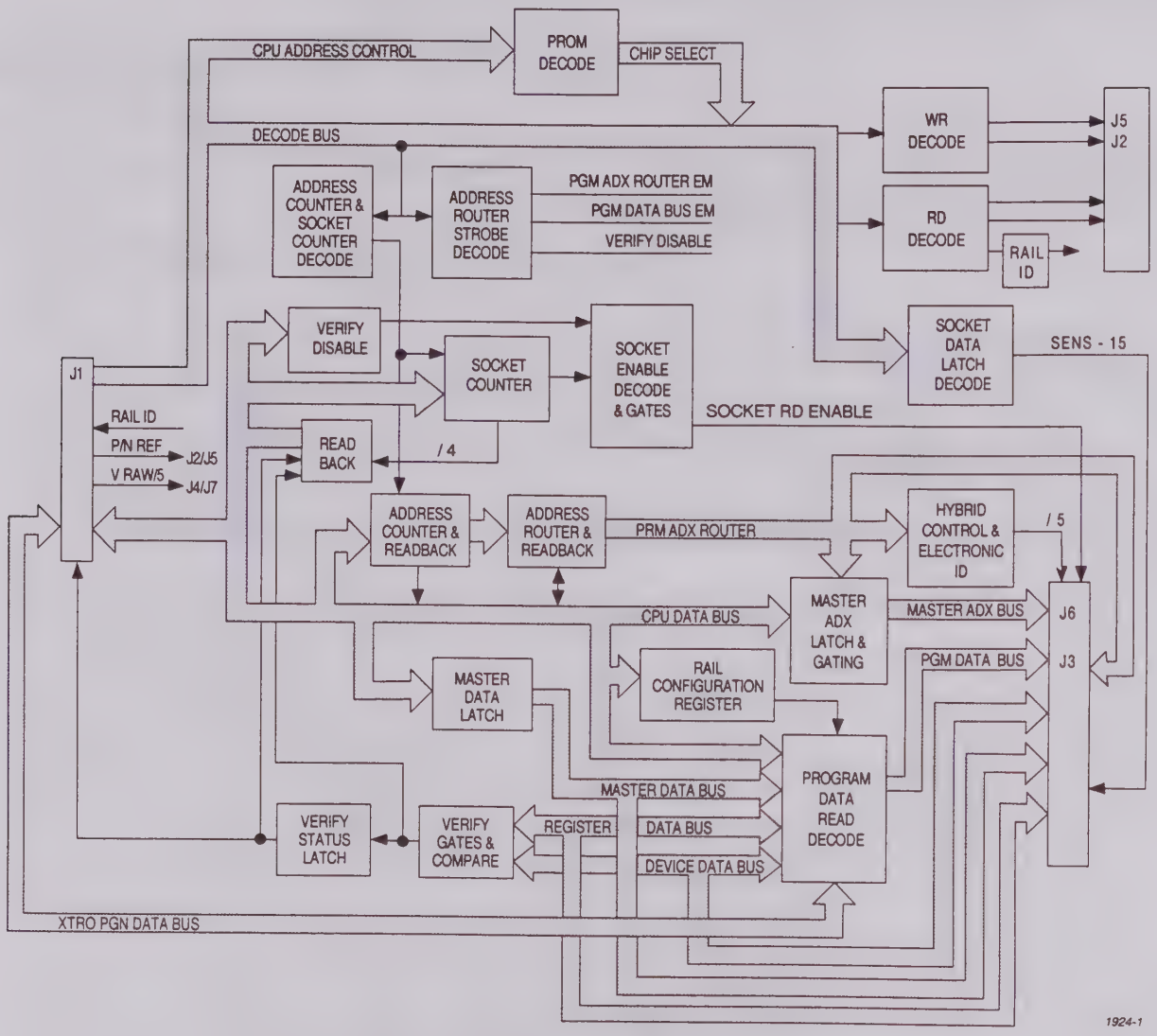


Figure 5-26
28-pin Rail Program Logic Board Block Diagram



6 Messages

This chapter includes an alphabetical list of the PSX messages with a description of the probable causes and corrective actions.

Some messages have been assigned a computer remote control (CRC) code that can be incorporated into a CRC driver. These CRC codes appear in parentheses in the message.

For more information, contact your nearest Customer Support office as listed in Appendix A for assistance.

Note: We recommend that you contact you nearest Customer Support office for board-level service or repair.

X V REFERENCE ERROR

The system XV supply (where X is the voltage value) is not within the appropriate range. The most likely cause of the failure is the CPU board (5V, 12V, and 32V) or power supply (10V). Suspect an out-of-calibration power supply (see Appendix D for calibration instructions), analog MUX, A/D converter or reference chip and associated circuitry. Contact your nearest Customer Support office for assistance.

*** AC POWER FAILURE ***

The AC input power went below the recommended operating voltage. Check the input line voltage and power supply on the control module.

ADDR CHECK INCORRECT (84)

The address checksum field is not the same as the calculated value. Repeat the operation that caused the error. If the error persists, check the transmitter source.

ADDRESS COUNTER ERROR

A write/read test to the address counter failed. The most likely cause of the failure is in the 28-pin rail logic board. Contact your nearest Customer Support office.

ADDRESS INCREMENT ERROR

The address counters failed to increment properly. The most likely cause of the failure is the Micro or Memory rail assembly. Contact your nearest Customer Support office.

ADDRESS INVALID (84)

Characters in the address field are neither hex or octal. Try the operation again. If the error persists, check the transmitter source.

ADDRESS ROUTER ERROR

The programmer attempted to route the upper 5 address lines, A11 through A15, to all routable socket pins, (pins 1, 2, 20, 22, 23, 26, 27, 28) and read back the appropriate routing through the read back buffer. The most likely cause of the failure is in the 28-pin rail logic board. Contact your nearest Customer Support office.

ADDRESS SETUP ERROR

The controller failed to run the address setup as defined. The most likely cause of the failure is the Micro or Memory rail assembly. Contact your nearest Customer Support office.

ADDRESS SPEEDUP ERROR

The address speedup circuit failed to limit the address setup to only one bit. The most likely cause of the failure is the Micro or Memory rail assembly. Contact your nearest Customer Support office.

AUTOCAL ERROR

The programmer attempted to perform an autocalibration on the REF*xx* lines and encountered a divide by zero condition. A REF line may be stuck at some voltage.. The most likely cause of the failure is the CPU board. Contact your nearest Customer Support office.

AUTOCALIBRATION ERROR (CE)

An error was detected during an attempt to autocalibrate. The unit may need servicing or calibration (see Appendix D). Contact your nearest Customer Support office.

BAD INTERRUPT-AUTO PROGM

The state machine was set to the Auto Program Mode and started. An interrupt was received, but the state machine did not go through the required number of cycles. Suspect the CPU board. Contact your nearest Customer Support office.

Note: In order for any state machine test to function properly, no other diagnostic errors can occur.

BAD INTERRUPT-AUTO VERFY

The state machine was set to the Auto Verify Mode and started. An interrupt was received, but the state machine did not go through the required number of cycles. Suspect the CPU board or rail logic board. Contact your nearest Customer Support office.

Note: In order for any state machine test to function properly, no other diagnostic errors can occur.

BAD INTERRUPT-PROG VERFY

The state machine was set to the Program Verify Mode and started. An interrupt was received, but the state machine did not go through the required number of cycles. Suspect the CPU board or rail logic board. Contact your nearest Customer Support office.

Note: In order for any state machine test to function properly, no other diagnostic errors can occur.

BAD INTERRUPT-QUICK PROG

The state machine was set to the Quick Program Mode and started. An interrupt was received, but the state machine did not go through the required number of cycles. Suspect the CPU board or rail logic board. Contact your nearest Customer Support office.

Note: In order for any state machine test to function properly, no other diagnostic errors can occur.

BITSIZE ERROR (30)

The bitsize selected is incompatible with the data width of the device type selected. For example, setting a bitsize (*nn*22]) of 24 and attempting to perform an operation on a 16-bit wide device causes a Bitsize Error. Valid bitsizes would be 16, 32, 48, and 64 (any integer multiple of the device word width).

BLOCK LIMIT ERROR (27)

The size of the data to be programmed exceeds the available user RAM. The begin RAM address, plus the product of the blocksize and wordsize [R + (B x W)] exceed the end of user RAM. Increase the amount of user RAM or reduce the block size (limit).

BUFFER OVERFLOW (48)

Serial port buffer overflow. Indicates that a handshake is needed (X-On/X-Off or RTS/CTS), or that the baud rates are incompatible.

BYTE COUNT INVALID (84)

The byte count field is not in hexadecimal.

CALIBRATION ERROR

After performing an autocalibration, an attempt to drive the REF*xx* lines to a known voltage using the calibration coefficients failed. The most likely cause of the failure is the CPU board. (See Appendix D.) Contact your nearest Customer Support office.

CHECKSUM INCORRECT (82)

The checksum field is not the same as the calculated value.

CHECKSUM INVALID (84)

The checksum field is not a valid hex or octal number.

CLOCK FREQUENCY ERROR

This error can occur when using a Micro or 40-pin rail. Suspect the socket boards or rail logic board. Contact your nearest Customer Support office.

CONTROLLER READ ERROR

The CPU wrote a data pattern to the master socket on pins 1 through 16. The controller then read back the master socket and the pattern read did not match the pattern previously written. The most likely cause of the failure is in the Memory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

CONTROLLER VERIFY ERROR

The controller failed to perform a verify function. The most likely cause of the failure is in the Memory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

CONTROLLER WRITE ERROR

The controller wrote a data pattern to the master socket. The controller then read the master socket and found that the pattern read did not match the pattern written. The most likely cause of the failure is in the Memory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

CPU DMA ERROR

A check of the CPU DMA registers or an actual movement of data using DMA in RAM did not function as expected. The most likely cause of the failure is the CPU board. Contact your nearest Customer Support office as listed in Appendix A for assistance.

CPU IRQ ERROR

A check of the CPU IRQ registers or the generation of internal CPU interrupts did not function as expected. The most likely cause of the failure is the CPU board. Contact your nearest Customer Support office.

CPU TIMER ERROR

A check of the CPU timer registers or a timeout test did not function as expected. The most likely cause of the failure is the CPU board. Contact your nearest Customer Support office.

DATA INVALID (84)

Characters in the data field are not hexadecimal or octal, or there are not enough characters to form a data field.

DATA READ BACK ERROR

The controller failed to do a data read back function. The most likely cause of the failure is in the Memory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

DATA SETUP ERROR

The controller failed to run the data setup as defined. The most likely cause of the failure is in the Memory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

DEVICE DATA SHORTS (33)

The device contains shorts between the data lines. The device cannot be correctly programmed or read. Replace the device.

DEVICE DETECTION ERROR

A device is present in a socket when performing diagnostics on the 28-pin rail. Remove the installed device to correct the error.

The position-sensing pins (pins 2, 3, and 15) on each socket were checked for valid voltage levels under three conditions.

1. The CMOS switches were left on and these pins were pulled up to 5V through their corresponding registers.
2. The CMOS switches were left on and these pins were pulled up to ground through their corresponding registers.
3. The CMOS switches were turned off and the voltage levels checked. The most likely cause of the failure is in the 28-pin rail assembly. Suspect all device-sensing circuitry and all registers associated with sockets pins 2, 3, and 15.

DEVICE DISABLE ERROR (31)

The device failed to disable when unselected. The device is faulty. Replace the device.

DEVICE ENABLE ERROR (32)

The device failed to enable when selected. The device is faulty. Replace the device.

DEVICE INSERTION ERROR (36)

The device has been inserted into the socket incorrectly. It may be backwards or misjustified, or some pins may not be making complete contact with the socket. Reinsert the device and try the operation again.

If the programmer displays this error when you know the device is inserted correctly, the most likely cause of the failure is the socket module. Contact your nearest Customer Support office.

DEVICE NONBLANK (20)

The device to be programmed already has data programmed into it. You can still program the device if no illegal-bit error is detected.

DIGITAL PIN ERROR

An error was found in the digital pin test on the socket(s) with a red LED. Use the Socket TTL Test in the **Diagnostics** menu to check for pins that do not toggle properly.

The most likely cause of the failure is in the Micro or 40-pin rail assembly or Memory rail driver board. The next most likely cause of the failure is the logic control board in the Memory, Micro, or 40-pin rail assembly. If any of the LEDs are lit up, suspect the corresponding socket board(s). Contact your nearest Customer Support office.

DRAM SIMM *JX* ERROR

Attempting a write/read test on already detected RAM failed. The most likely cause of the failure is the CPU board or bad DRAM. Suspect the RAM SIMMs or refresh circuitry. Try replacing the SIMMs (see the "Updating Firmware or Installing a RAM Upgrade" section on page 7-12 for instructions). Contact your nearest Customer Support office.

EEPROM ERROR

If this error is encountered during normal operation, the system may prompt `ENTER TO INITIALIZE.`

Pressing **ENTER** causes the programmer to attempt to initialize non-volatile memory back to the factory default values. If the programmer cannot initialize memory, it displays `UNABLE TO INITIALIZE`. No other operations can be performed until the EEPROM is replaced.

ENX ROUTER ERROR

The ENX line from the state machine (where X is the number of the line) was unsuccessfully routed to all routable pins. Suspect the CPU board and check the hardware associated with an address router error on the rail. Contact your nearest Customer Support office.

EXCESSIVE SOCKET CYCLES

The sockets have reached the warranted number of insertion cycles per socket. You should replace the sockets and clear socket cycles at this interval. Contact your nearest Customer Support office as listed in the Preface to order a socket replacement kit. See the "Socket Warranty and Replacement" section on page D-2 for replacement kit part numbers and replacement instructions.

This message can also occur when the lithium battery is removed or needs replacement. Due to environmental concerns, the battery must be disposed of in a specific manner. See the "Replacing the Line Fuse" section on page 7-9 for instructions on replacing and disposing of the battery.

FALL TIME ERROR

Suspect the rail socket boards. Contact your nearest Customer Support office.

FATAL ERROR: *XXX*

An unexpected interruption occurred. *XXX* is the type of error. Contact your nearest customer Support office.

FIRMWARE CHECKSUM ERROR

The calculated checksum over all firmware PROMs does not match the value stored in programmer PROM. Check for an incorrectly installed or bad PROM (in socket U3 on the CPU board).

FORCE IDLE ERROR

The controller's busy line was detected as active after it was forced to stop. The most likely cause of the failure is the logic control board in the Memory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

FORCED MISVERIFY FAILURE

The verifier failed to mark a socket as misverified. The most likely cause of the failure is in the emory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

FRAMING ERROR (41)

Indicates a serial input start/stop bit mismatch. Repeat the operation. Check that the baud rate of the PSX and the transmitter source match.

GROUND PIN ERROR

Suspect the Memory, Micro, or 40-pin rail socket boards. Contact your nearest Customer Support office.

HI ADDR REG CLEAR ERROR

The high address register failed to clear. The most likely cause of the failure is in the Memory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

HI ADDRESS REG R/W ERROR

The high address register failed the read/write test. The most likely cause of the failure is the board in the Memory, Micro, or 40-pin rail assembly. The next most likely cause of the failure is the CPU board. Contact your nearest Customer Support office.

HI SHIFT REG R/W ERROR

The high-shift register failed the read/write test. logic control board in the Memory, Micro, or 40-pin rail assembly. The next most likely cause of the failure is the CPU board. Contact your nearest Customer Support office.

IEEE-488 CHIP ERROR

Attempting a write/read test on the IEEE-488 control registers failed. The most likely cause of the failure is the CPU board or IEEE cable. Contact your nearest Customer Support office.

IEEE-488 DMA ERROR

An attempt to write/read the DMA control register did not perform as expected. The most likely cause of the failure is the CPU board or IEEE cable. Contact your nearest Customer Support office.

IEEE-488 IRQ ERROR

Attempting to force an interrupt from the IEEE-488 controller failed. The most likely cause of the failure is the CPU board or IEEE cable. Contact your nearest Customer Support office.

IEEE-488 LINK ERROR

Attempting to perform a write/read test over the IEEE-488 link failed. The most likely cause of the failure is the CPU board or IEEE cable.

ILLEGAL BIT ERROR

The device to be programmed has data in it that cannot be written over. Erase the device or replace the device with a blank device before attempting to program again. Contact your nearest Customer Support office.

ILLEGAL BIT FAILED

The verify circuitry did not detect an illegal bit when one was expected. The most likely cause of the failure is in the 28-pin rail assembly. Contact your nearest Customer Support office.

INPUT COMPARE ERROR (52)

The data input from the port is not the same as the data in RAM.

INVALID DEVICE SELECTED (25)

The device type selected is not valid for the operation selected. This condition can occur when attempting to do EEPROM tests on a non-EEPROM device. Specify a valid device type.

INVALID ELECTRONIC ID (83) (3C)

The electronic ID read from the device is not correct for the device type selected, or is not present at all.

INVALID LOWER RAIL ID

The ID read from the lower rail is not correct. The most likely cause of the failure is the CPU board. The next most likely cause of the failure is the logic control board in the rail assembly. Contact your nearest Customer Support office.

INVALID SET (3E)

This error can occur during either a load or a program/verify operation.

During a load operation, the number of devices present or that passed device testing is less than the specified setsize. Insert a valid set of devices.

During a programming or verifying operation, the product of the setsize and wordsize [S x W] exceeds the number of device sockets. Specify a valid setsize and wordsize so that their product is valid. Also, the devices selected cannot support set operations, such as microprocessors.

INVALID UPPER RAIL ID

The ID read from the upper rail is not correct. The most likely cause of the failure is the CPU board. The next most likely cause of the failure is the logic control board in the rail assembly. Contact your nearest Customer Support office.

I/O TIMEOUT ERROR (46)

Data was not received over the active port in the required amount of time. Repeat the operation. If the error persists, verify the cable connections.

KEYBOARD ERROR

An attempt to clear the keyboard controller did not function correctly. Suspect the CPU board, a stuck key on the keyboard, or cable. Contact your nearest Customer Support office.

LCD DISPLAY ERROR

A write/read of display RAM failed. The most likely cause of the failure is the CPU board. Suspect the display. Contact your nearest Customer Support office.

LEFT SOCKET BRD MISSING

The left socket board cannot be detected as installed in the Memory, Micro, or 40-pin rail. The most likely cause of the failure is in the Memory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

LO ADDR REG CLEAR ERROR

The low address register failed to clear. The most likely cause of the failure is in the Memory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

LO ADDRESS REG R/W ERROR

The low address register failed the read/write test. The most likely cause of the failure is the logic control board in the Memory, Micro, or 40-pin rail assembly. The next most likely cause of the failure is the CPU board. Contact your nearest Customer Support office.

LO SHIFT REG R/W ERROR

The low shift register failed the read/write test. The most likely cause of the failure is the logic control board in the Memory, Micro, or 40-pin rail assembly. The next most likely cause of the failure is the CPU board. Contact your nearest Customer Support office.

MASTER INSERTION ERROR (37)

Either the master device has been inserted incorrectly or is not present (if the operation requires a master). Correctly insert the master device.

If the programmer displays this error when you know the device is inserted correctly the most likely cause of the failure is the rail socket board. Contact your nearest Customer Support office.

MASTER NOT SUPPORTED (2B)

A master operation was attempted with a device that does not support master operations with the current PSX hardware configuration.

MASTER ROUTER ERROR

Suspect the 28-pin rail logic board. Contact your nearest Customer Support office.

MID ADDR REG CLEAR ERROR

The middle address register failed to clear. The most likely cause of the failure is in the Memory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

MID ADDRESS REG R/W ERROR

The middle address register failed the read/write test. The most likely cause of the failure is in the Memory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

MISVERIFY DETECT FAILED

The verify circuitry did not detect a misverify when one was expected. The most likely cause of the failure is in the 28-pin rail assembly. Contact your nearest Customer Support office .

XX MOD CHECKSUM ERROR

The installed module (where *XX* is upper left (UL), upper right (UR), lower left (LL), or lower right (LR)), has a checksum error in the internal intialization data. Contact your nearest Customer Support office

XX MOD NOT INITIALIZED

The installed module (where *XX* is upper left (UL), upper right (UR), lower left (LL), or lower right (LR)), is not initialized. Contact your nearest Customer Support office.

MODE REGISTER R/W ERROR

The mode control register failed the read/write test. The most likely cause of the failure is the Memory, Micro, or 40-pin rail assembly. The next most likely cause of the failure is the CPU board. Contact your nearest Customer Support office.

NO DEVICES PRESENT (3B)

During a programming or verifying operation, the programmer does not detect devices in the module. Insert the devices.

NO ELECTRONIC ID (81) (3D)

No electronic ID was read from the device. Either the device does not support electronic ID, or the device is faulty.

NO INTERRUPT-AUTO PROGM

The state machine was set to Auto Program Mode and started. An interrupt was not received at the CPU from the state machine. Suspect the CPU board. Contact your nearest Customer Support office.

Note: In order for any state machine test to function properly, no other diagnostic errors can occur.

NO INTERRUPT-AUTO VERFY

The state machine was set to Auto Verify Mode and started. An interrupt was not received at the CPU from the state machine. Suspect the CPU board. Contact your nearest Customer Support office.

Note: In order for any state machine test to function properly, no other diagnostic errors can occur.

NO INTERRUPT-PROG VERFY

The state machine was set to the Program Verify Mode and started. An interrupt was not received at the CPU from the state machine. Suspect the CPU board and socket counter on the rail. Contact your nearest Customer Support office.

Note: In order for any state machine test to function properly, no other diagnostic errors can occur.

NO INTERRUPT-QUICK PROG

The state machine was set to the Quick Program Mode and started. An interrupt was not received at the CPU from the state machine. Suspect the CPU board and the socket counter on the rail. Contact your nearest Customer Support office.

Note: In order for any state machine test to function properly, no other diagnostic errors can occur.

NO RAILS

Rails are either not installed, or installed, but not making a connection with the PSX control module. Reinstall the rail. See "Disassembling the PSX" on page 7-3 for instructions on how to remove a rail; see "Installing Rail(s)" on page 2-2 for instructions on how to attach a rail to the control module. If the programmer continues to display this message, suspect the rail. Contact your nearest Customer Support office.

NO RAILS DETECTED (26)

The incorrect socket rail or no socket rail is installed for the device selected. Power down the programmer and install the correct socket rail. See "Disassembling the PSX" on page 7-3 for instructions on how to remove a rail; see "Installing Rail(s)" on page 2-2 for instructions on how to attach a rail to the control module.

OPERATION STOPPED (FF)

The operation was stopped by the operator.

******** OVERCURRENT *******

Check if a device is inserted into a socket. If so, remove the device. If not, the socket indicated is causing an overcurrent. The most likely cause of the failure is the module socket board. Contact your nearest Customer Support office.

OVERCURRENT ERROR (38) (39)

More current than allowed was drawn by the device during a read or write operation. This discontinues all operations. The device is faulty. Replace the device.

OVERCURRENT TEST FAILURE

Suspect rail socket boards. Contact your nearest Customer Support office.

OVERRUN ERROR (42)

Input character lost in serial port receive buffer. Repeat the operation. If the error persists, check the baud rate setting and/or install a hardware handshake system (RTS/CTS).

PGM ROUTER ERROR

The PGM line from the state machine was unsuccessfully routed to all routable pins. Check the same hardware associated with an address router error. Contact your nearest Customer Support office.

PIN *XX* COMPARATOR ERROR

The analog comparator on pin *XX* (where *XX* is the number of the pin) of the device socket failed to give the correct reading. The most likely cause of the failure is the socket module assembly. Contact your nearest Customer Support office.

PIN *XX* GROUND FAILURE

Pin *XX* (where *XX* is the number of the pin) of the device socket failed to pull low when the ground switch was turned on. The most likely cause of the failure is the Memory, Micro, or 40-pin rail assembly. Suspect the socket boards on the Micro or 40-pin rail. Suspect the socket modules on the Memory rail. Contact your nearest Customer Support office.

PIN *XX* STATE MACHINE ERR

Pin *XX* (where *XX* is the number of the pin) of the device socket failed when the state machine routed signal was applied. The most likely cause of the failure is in the Memory, Micro, or 40-pin rail socket board. The next most likely cause of the failure is the logic control board in the Memory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

PIN DISABLE ERROR

Rail error. Suspect the 28-pin rail assembly. Contact your nearest Customer Support office.

PIN DRIVER ERROR

Suspect the module assembly. Contact your nearest Customer Support office.

PIN DRIVER LOAD ERROR

Suspect the rail assembly. Contact your nearest Customer Support office.

PIN DR LINEARITY ERROR

Suspect the 28-pin rail assembly. Contact your nearest Customer Support office.

PROGRAMMING ERROR (22)

The device failed to program. This may have occurred because the device cannot be programmed. Attempt the operation again, using a new device of the same type.

RAIL DAC ERROR

The Micro or 40-pin rail DAC did not fall within the specified tolerance of the voltage to which it was programmed. The most likely cause of the failure is the logic control board in the Micro or 40-pin rail assembly. The next most likely cause of the failure is the driver board in the Micro or 40-pin rail assembly. Contact your nearest Customer Support office.

RAIL MODE SWITCH ERROR

Suspect the Memory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

RAIL RAM ERROR

The Memory, Micro, or 40-pin rail RAM did not pass the read/write error. The most likely cause of the failure is in the Micro or Memory rail assembly. Contact your nearest Customer Support office.

********* RAM ERROR ******

Attempting to read the dynamic RAM resulted in a parity error. Suspect the Control module DRAM SIMMs or the CPU board. Contact your nearest Customer Support office.

RAM PARITY ERROR

Attempting to read the dynamic RAM resulted in a fatal parity error. Suspect the RAM SIMMs, or CPU board. Try replacing the SIMMs (see the "Updating Firmware or Installing a RAM Upgrade" section on page 7-14 for instructions). Contact your nearest Customer Support office.

RECORD INCORRECT (90)

The record type is invalid or the record count is incorrect. Try the operation again. If the error persists, check the format type or transmitter source.

REF ROUTER ERROR

With all DACs off and all routers off, a voltage was read on one of the REF*xx* lines. The most likely cause of the failure is the CPU board. The next most likely cause of the failure is the logic control board in the Memory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

REF TTL ERROR

Attempting to set the V_{CC} DAC to 5V and turning off all routers did not yield a voltage between 4V and 5V on REF1, 22, 23 and 26 and a near zero voltage on REF28. The most likely cause of the failure is the CPU board. Contact your nearest Customer Support office.

REF TURNOFF ERROR

Turning off the voltage reference router failed (attempting to set V_{CC} DAC to 0V and V_{PP} DAC to 25V with all routers off did not yield a near zero voltage on all REF lines). The most likely cause of the failure is the CPU board. Contact your nearest Customer Support office.

REF VCC ERROR

Attempting to set all REF*xx* (V_{CC} REF) voltages to 5V failed. The most likely cause of the failure is the CPU board. Contact your nearest Customer Support office.

REF VPP ERROR

Attempting to set REF1, 22, and 23 (V_{PP} REFs) to 25V failed. The most likely cause of the failure is the CPU board. Contact your nearest Customer Support office.

REQUIRES UPDATED MODULE
CALL CUSTOMER SERVICE

Before you can program an AMD 29F010-EC or 29F040-EC device, your 32TSOP module must be reworked. Contact your nearest Customer Support office.

RIGHT SOCKET BRD MISSING

The right socket board cannot be detected as installed in the Memory, Micro, or 40-pin rail. The most likely cause of the failure is in the Memory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

RISE TIME ERROR

Suspect the rail socket boards. Contact your nearest Customer Support office.

ROUTER OVERRIDE FAILURE

Attempting to manually move each routable pin (pins 1, 2, 20, 22, 23, 26, 27, and 28) and read each pin's state back through the router read back buffer failed. The most likely cause of the failure is in the 28-pin rail assembly. Contact your nearest Customer Support office.

SERIAL CHIP ERROR

Attempting a write/read test of characters through the serial chip in local loopback mode failed. The most likely cause of the failure is the CPU board or serial cable. Contact your nearest Customer Support office.

SERIAL IRQ ERROR

Attempting a write/read test of characters through the serial chip in local loopback mode using the interrupt failed. Suspect the CPU board. Contact your nearest Customer Support office.

SERIAL PARITY ERROR (43)

Parity error detected on serial input data. Repeat the operation. If the error persists, verify that the transmitter is sending the correct parity.

SHORTED ANALOG ERROR

Check for shorted analog driver pins on a Memory, Micro, or 40-pin rail socket.

SHORTED PIN ERROR

Check for shorted pins on a 28-pin rail socket.

SHORTED TTL ERROR

Check for shorted digital driver pins on a socket. The most likely cause of the failure is the Memory, Micro, or 40-pin rail socket board. Contact your nearest Customer Support office.

SIL SIG VOLTAGE ERROR

Check the prm adx. router bus pin 24 (U59 and Q6 on the logic board) for the 28-pin rail.

SLEW ERROR

Suspect the 28-pin rail socket boards or the CPU board. Contact your nearest Customer Support office.

SM SOCKET VERIFY FAILURE

The Memory, Micro, or 40-pin rail failed to flag sockets as misverified when the state machine started a verify cycle. The most likely cause of the failure is in the Micro or Memory rail assembly. Contact your nearest Customer Support office.

SM VERIFY HALT FAILURE

The state machine failed to halt after it started a verify operation on the Memory, Micro, or 40-pin rail. The most likely cause of the failure is in the Memory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

SM VERIFY STATUS BIT ERR

The verify status bit in the state machine status register failed to go high, indicating a verify error on the Memory, Micro, or 40-pin rail. The most likely cause of the failure is in the Memory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

SOC DIGITAL DISABLE ERR

A socket on the Memory, Micro, or 40-pin rail was disabled for digital input, yet it accepted data written to it. The most likely cause of the failure is in the Memory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

SOCKET DISABLE ERROR

A test was performed to see if all 15 socket read back buffers could be verify disabled. Those with red LEDs failed this test. The most likely cause of the failure is in the 28-pin rail assembly. Contact your nearest Customer Support office.

SOCKET NUMBER REG ERROR

A write/read test to the socket counter failed. The most likely cause of the failure is in the 28-pin rail assembly. Contact your nearest Customer Support office.

SOCKET POINTER REG ERROR

The socket pointer registers allowed a socket to misverify when verify errors should have been disabled. The most likely cause of the failure is in the Memory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

SOCKET REG DISABLE ERROR

A test was performed to see if all 15 register read back buffers could be verify disabled. Those with red LEDs failed this test. The most likely cause of the failure is in the 28-pin rail assembly. Contact your nearest Customer Support office.

SOCKET SEL REG R/W ERROR

The socket select register failed the read/write test. The most likely cause of the failure is in the Memory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

SOCKET WRITE/READ ERROR

Several data patterns were written to each write/read error socket register and read back through the Device Data Bus and the Register Data Bus. Those sockets with red LEDs failed this test. The most likely cause of the failure is in the 28-pin rail assembly. Contact your nearest Customer Support office .

STATE MACHINE TTL ERROR

Suspect the Memory, Micro, or 40-pin rail socket boards. Contact your nearest Customer Support office.

STATIC RAM ERROR

A write/read test to static RAM failed. Contact your nearest Customer Support office.

SYSTEM PARAMETERS ERROR

If this error is encountered during normal operation, the system may prompt `ENTER TO INITIALIZE.`

Pressing ENTER causes the programmer to attempt to initialize nonvolatile memory back to the factory default values. If the programmer cannot initialize memory, it displays `UNABLE TO INITIALIZE` . No other operations can be performed until the system parameters are reinitialized.

TTL RISE/FALL ERROR

Suspect the 28-pin rail assembly. Contact your nearest Customer Support office.

TTL TEST ERROR

Suspect the rail assembly. Contact your nearest Customer Support office.

TWO MASTERS ERROR (3A)

Parallel rail programming is specified and a master device is detected in each rail. Remove one of the masters or select alternate rail programming.

UNEXPECTED ILLEGAL BIT

The verify circuitry detected an illegal bit when one was not expected. The most likely cause of the failure is the program logic board in the 28-pin rail assembly. Contact your nearest Customer Support office.

UNKNOWN ID

The electronic ID read from the device does not match any known manufacturer ID.

VERIFY CIRCUIT ERROR

Suspect the 28-pin rail logic board. Contact your nearest Customer Support office.

VERIFY DETECT FAILED

The verify circuitry detected a misverify when one was not expected. The most likely cause of the failure is in the 28-pin rail assembly. Contact your nearest Customer Support office.

VERIFY DISABLE REG ERROR

The verify disable registers allowed a socket to misverify when verify errors should have been disabled. The most likely cause of the failure is in the Memory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

VERIFY ERROR (29)

The device failed to program or verify properly when compared with RAM or master. The device contains incorrect data, or the device data is not being compared against the block of data that it was programmed with. Make sure that the correct block of data was specified for the verify operation, or erase the device, if possible, and attempt to program it again, or discard the faulty device.

If the programmer displays this error when you know the device is a good device the most likely cause of the failure is the logic board (when all LEDs are lit) or the Memory rail driver board or 40-pin assembly. Contact your nearest Customer Support office.

VERIFY PAL ERROR

The verify PAL status bit would not clear. The most likely cause of the failure is the logic board in the Memory, Micro, or 40-pin rail assembly. Contact your nearest Customer Support office.

VPP SWITCH FAILURE

An error was found during the check for V_{PP} switch functionality. Suspect the rail.

WARNING: MEMORY RAIL BAD

A Memory rail did not pass the diagnostic routine. All LEDs are red on the failed rail(s). Enter the Diagnostics menu and rerun the tests (see the "Diagnostics" section on page 5-3). If the PSX generates this error again, contact your nearest Customer Support office.

WARNING: MICRO RAIL BAD

A Micro rail did not pass the diagnostic routine. All LEDs are red on the failed rail(s). Enter the Diagnostics menu and rerun the tests (see the "Diagnostics" section on page 5-3). If the PSX generates this error again, contact your nearest Customer Support office.

WARNING: 28-PIN RAIL BAD

A 28-pin rail did not pass the diagnostic routine. Enter the Diagnostics menu and rerun the tests (see the "Diagnostics" section on page 5-3). If the PSX generates this error again, contact your nearest Customer Support office.

WARNING: 40-PIN RAIL BAD

A 40-pin rail did not pass the diagnostic routine. Enter the Diagnostics menu and rerun the tests (see the "Diagnostics" section on page 5-3). If the PSX generates this error again, contact your nearest Customer Support office.

7 Maintenance

This chapter includes the following sections:

Reducing Electrostatic Discharge 7-2
Disassembling the PSX 7-3
Cleaning the PSX 7-4
Removing the Bottom Cover 7-5
Replacing the Lithium Battery 7-6
Replacing the Line Fuse 7-9
Updating Firmware or Installing the RAM Upgrade 7-12

CAUTION: ***The procedures in this chapter must be performed by a qualified electronic service technician. Do not attempt to perform these procedures if you are not qualified to do so.***

WARNING: Disassembling the programmer when power is applied can cause severe electric shock.

Spare Parts

Spare parts are available from Data I/O. Call the Service Dispatch Group at 800-735-6070 to request spare parts.

Replacing Sockets

For procedures on how to replace sockets, refer to Appendix D.

Calibrating the PSX

For information on how to calibrate the PSX, refer to Appendix D.

Reducing Electrostatic Discharge

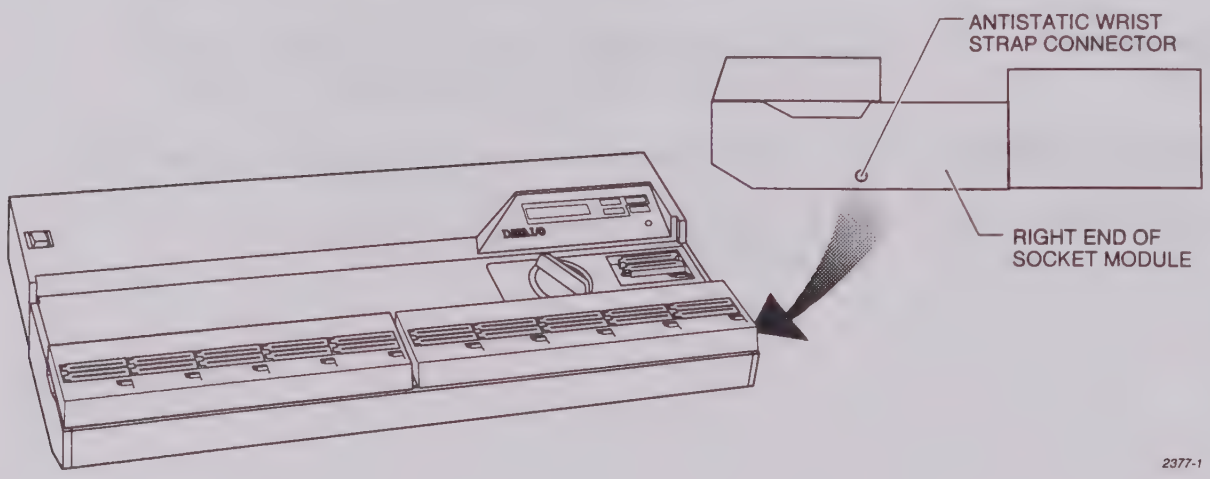
The circuit boards inside the PSX are susceptible to electrostatic discharge (ESD), which can damage the circuitry inside the programmer.

The easiest way to prevent damage from ESD is to make sure a common static potential (ground) exists between the static-sensitive device, its environment, and you. To accomplish this, ground yourself to an antistatic workstation with an antistatic wrist strap, and cover the surface of the workstation with an antistatic material.

WARNING: To avoid electric shock, use an antistatic wrist strap that contains a 1 MΩ (minimum) to 10 MΩ (maximum) isolating resistor.

Ideally, you should ground the programmer to a grounded antistatic workstation and wear a wrist strap that is connected to the same antistatic workstation. An ambient temperature of 18° to 28°C (64.4° to 82.4°F) and relative humidity less than 85% should be maintained.

If you do not have an antistatic workstation available, wear an antistatic wrist strap and connect it to the PSX's wrist strap connector on the right side of a rail.



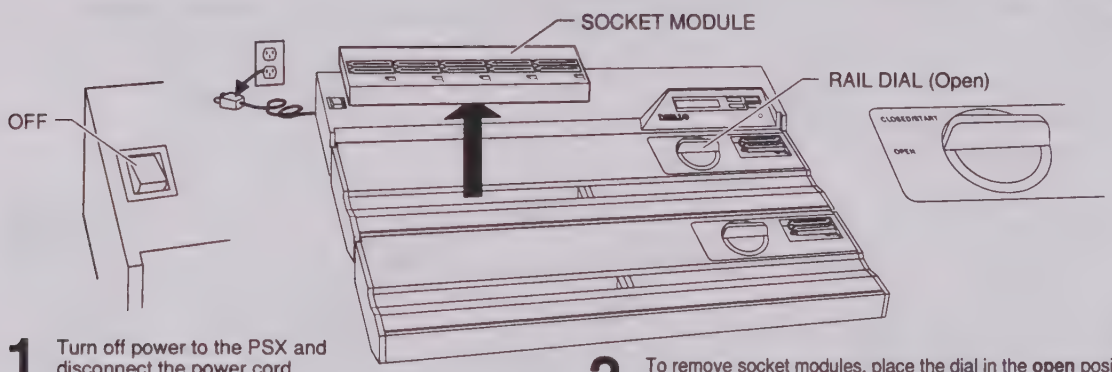
Disassembling the PSX

WARNING: Disassembling or reassembling the PSX when power is applied can cause severe electric shock.

CAUTION: Disassembling or reassembling the PSX when power is applied can damage the programmer and socket modules, and voids the warranty.

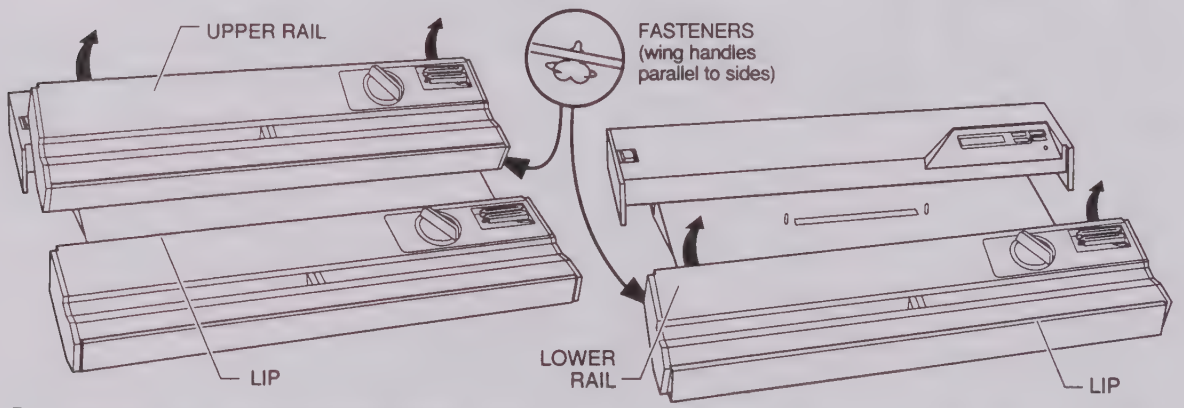
Control Module Disassembly and Reassembly

Please refer to the following illustration when disassembling and reassembling your PSX control module for cleaning:



1 Turn off power to the PSX and disconnect the power cord and any shielded I/O cables.

2 To remove socket modules, place the dial in the **open** position. (Socket modules cannot be removed when dial is in the closed position.) Firmly grip the socket module and pull straight up.



3 On the PSX1000, turn the four upper fasteners (two on each side) 1/4 turn to the open (unlocked) position. Tilt the upper rail forward to a 45-degree angle, and lift the rail clear of the programmer chassis and the lip on the back edge of the lower rail.

4 Turn the lower fasteners (one on each side) 1/4 turn to the open (unlocked) position, then tilt the rail forward to a 45-degree angle, and lift it clear of the lip on the front edge of the programmer.

2367-1

Disassembling Socket Modules

The "Socket Warranty and Replacement" section in Appendix D includes instructions on how to disassemble and reassemble socket modules. Please refer to these sections when disassembling and reassembling your PSX socket modules for cleaning

Maintenance

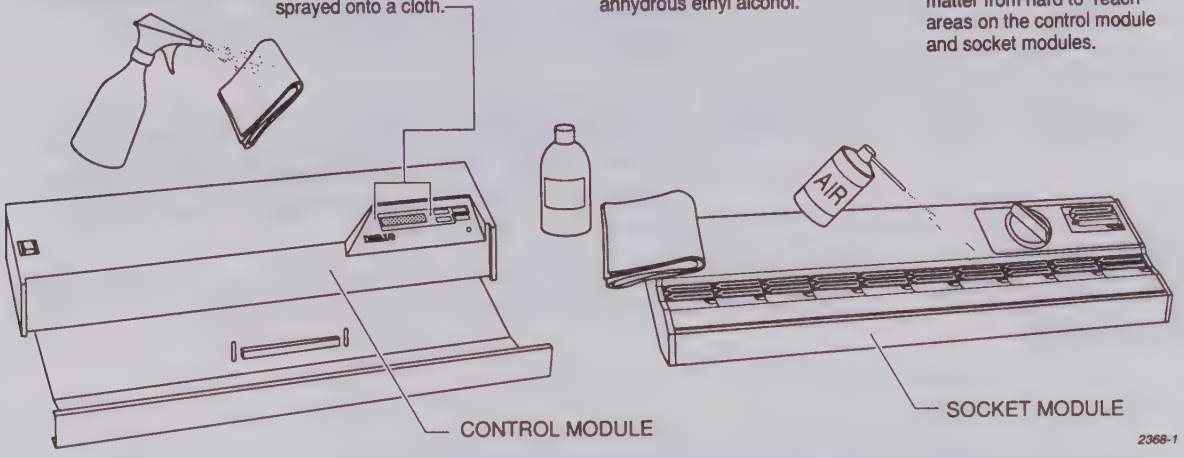
Cleaning the PSX

1 Disassemble the PSX.

2 Clean the display with a nonabrasive glass cleaner sprayed onto a cloth.

3 Clean the PSX exterior using a soft cloth dampened with anhydrous ethyl alcohol.

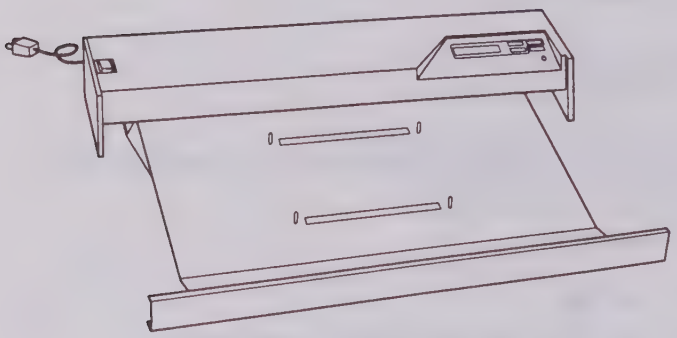
4 Use low-pressure, clean, dry air to remove dust or foreign matter from hard to reach areas on the control module and socket modules.



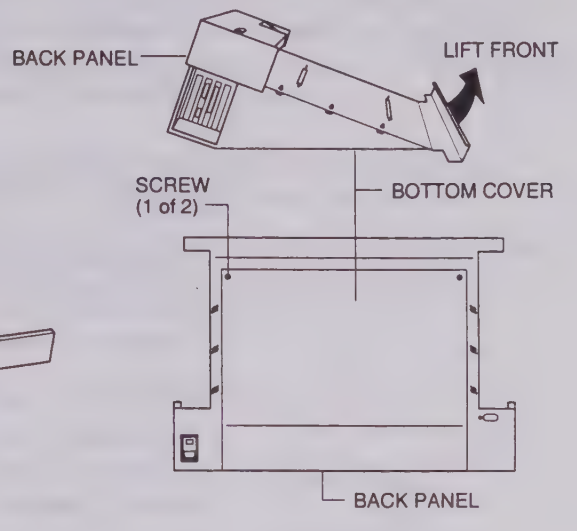
Removing the Bottom Cover

1 Disassemble PSX (See page 7-3).

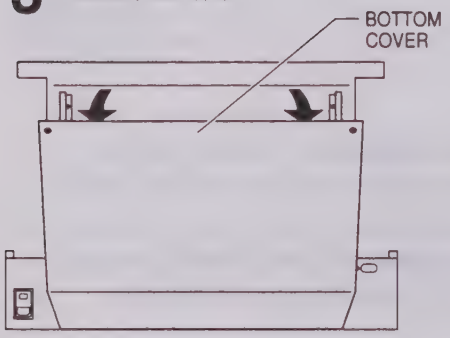
Note: Make sure power is turned off.



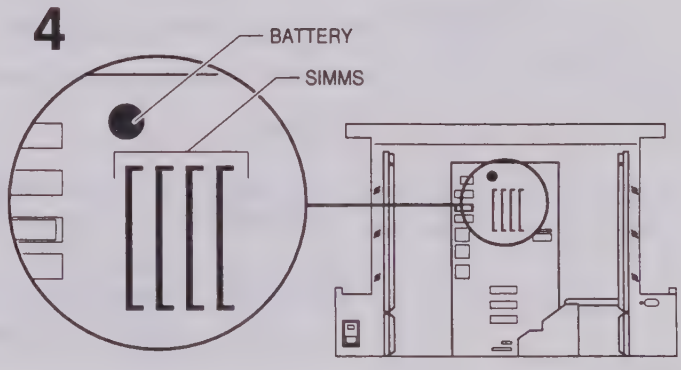
2 Turn the control module upright on its back panel and remove the Phillips-head screws securing the bottom cover.



3 Remove bottom cover.



4



2369-1

Replacing the Lithium Battery

The PSX contains a lithium battery that provides power for storing the programmer setup when the PSX is not running. If your PSX is powered up most of the time, you may never need to replace the battery.

If the battery needs to be replaced, the PSX may display one of the following message upon powerup:

```
EXCESSIVE SOCKET CYCLES
```

or

```
INITIALIZING SYSTEM
PARAMETERS
```

To disassemble the PSX, replace the battery, and reassemble the PSX, you need the following tools:

- Antistatic workstation
- Antistatic wrist strap

  To avoid electric shock, use an antistatic wrist strap containing a 1 MΩ (minimum) to 10 MΩ (maximum) isolating resistor.
- Cotton or surgical gloves
- Small flat-head screwdriver
- Phillips screwdriver
- (*Optional*) A 3.5-digit Digital Multimeter (DMM) with an accuracy of ±0.25% V dc (for example, a Fluke 8050A DMM)

WARNING: Disassembling or reassembling the PSX when power is applied can cause severe electric shock.

CAUTION: Disassembling or reassembling the PSX when power is applied can damage the programmer and socket modules, and voids the warranty.

Disassemble the PSX

Before you can replace the lithium battery, you must disassemble the PSX as described on pages 7-3 and remove the bottom cover as described on page 7-5.

CAUTION: Be sure to turn off power to the PSX and disconnect the power cord and any shielded I/O port cables from the PSX before beginning the disassembly process.

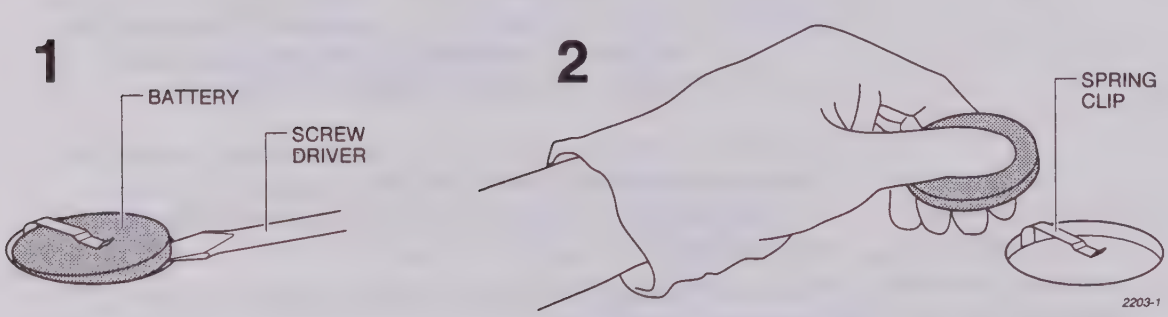
Remove the Old Battery

Locate the lithium battery on the PSX's CPU board (see page 7-5). Remove the old battery as follows:

1. Put on the cotton or surgical gloves.

CAUTION: ***For best performance, do not touch the battery without gloves on. If the battery comes into contact with the oils on your skin, it could short and not last as long as it should.***

2. Insert the flat-blade screwdriver in one of the open slots around the plastic battery holder and under the battery.
3. Lift the battery out of the holder enough to grasp the battery edges between the fingers of your other hand. Slip the battery out from under the spring clip.



4. At this point, you may want to use a voltmeter to verify that the battery needs to be replaced. A good battery should measure 2.5V to 3.0V.
5. Dispose of the expended lithium battery according to the battery manufacturer's instructions.

WARNING: Disposal of lithium batteries in the United States is regulated by the U. S. Environmental Protection Agency (EPA). Lithium batteries (whether live or expended) are considered a hazardous waste and must be disposed of in accordance with local and federal hazardous material disposal laws and regulations. Land disposal of lithium batteries is prohibited unless they are treated or otherwise rendered non-reactive.

Lithium batteries should not be opened, crushed, punctured, or otherwise mutilated, because this will release sulfur dioxide and the electrolyte and expose hazardous materials.

WARNING: Collect and transport cells and batteries for disposal in a manner that prevents short circuit, compacting, mutilation, or any other abusive physical or electrical handling that would destroy their physical integrity. Contact the battery manufacturer (Ray-O-Vac, Panasonic, or Seiko) for more information.

Install a New Battery

1. Make sure the replacement battery is a 3-volt battery of the same or equivalent type as a BR2325 battery.

CAUTION: Replace the battery only with the same or equivalent type recommended by the battery manufacturer. Dispose of used batteries according to the battery manufacturer's instructions.

WARNING: There is a danger of explosion if the battery is incorrectly replaced. (A fire can start if the battery is installed upside-down.)

2. Wearing the cotton or surgical gloves and with the positive side of the battery (the side with the plus sign (+) on it) toward you, insert the new battery between the battery holder and spring clip.
3. Press on the top of the battery until it is fully seated in the battery holder.

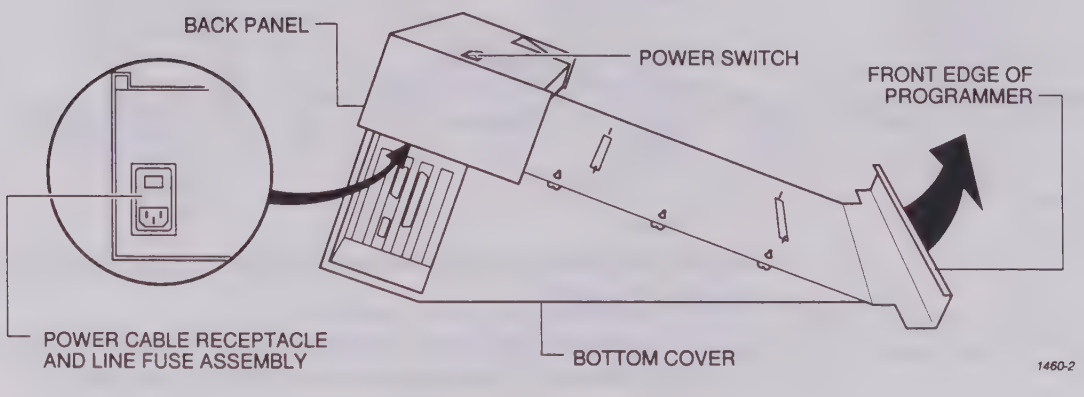
Reassemble the PSX

Reassemble the PSX as follows:

1. Replace the bottom cover in its original position.
2. Reinstall the Phillips-head screws securing the bottom cover to the chassis.
3. Return the programmer to its upright position and reconnect the power cord (see the "Connecting Power Cord" section on page 2-9) and any shielded I/O port cables (see the "Connecting I/O Port Cable" section on page 2-8).
4. Reinstall rail(s) as directed in the "Installing Rails" section on page 2-2 and reinstall socket modules (if necessary) as directed in the "Installing Socket Modules" section on page 2-5.
5. Power up the programmer (see the "Turn on the Power" section on page 2-9).

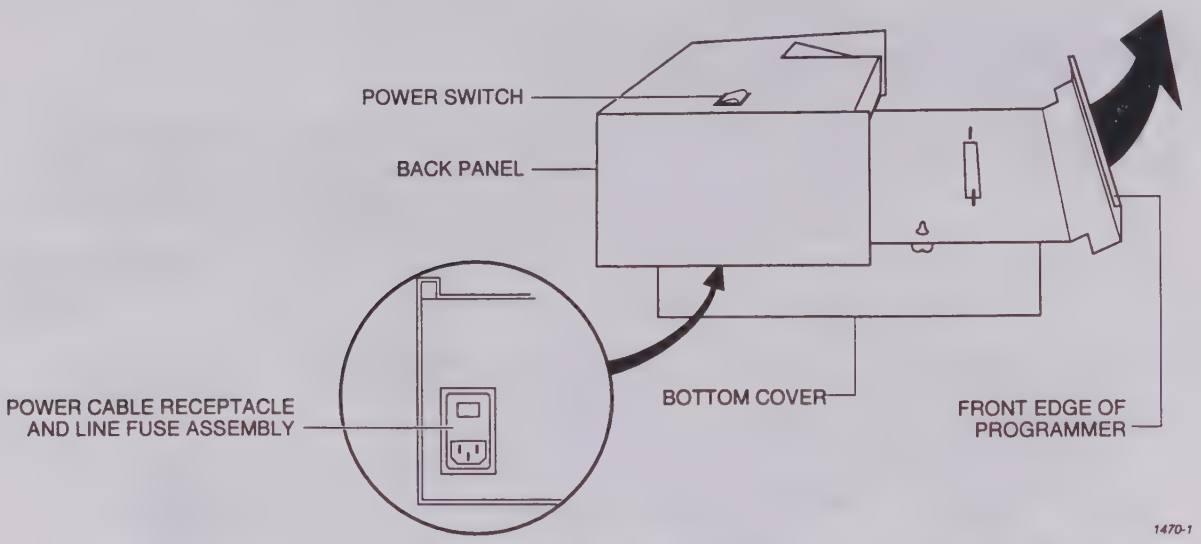
Replacing the Line Fuse

The line fuse is located in the fuse assembly on the underside of the control module directly underneath the power switch. The following two illustrations show the PSX1000 and PSX500 power cable receptacle and line fuse assembly locations.



CAUTION: ***The procedures in this section must be performed by a qualified electronic service technician. Do not attempt to perform these procedures if you are not qualified to do so.***

WARNING: Disassembling the programmer when power is applied can cause severe electric shock.

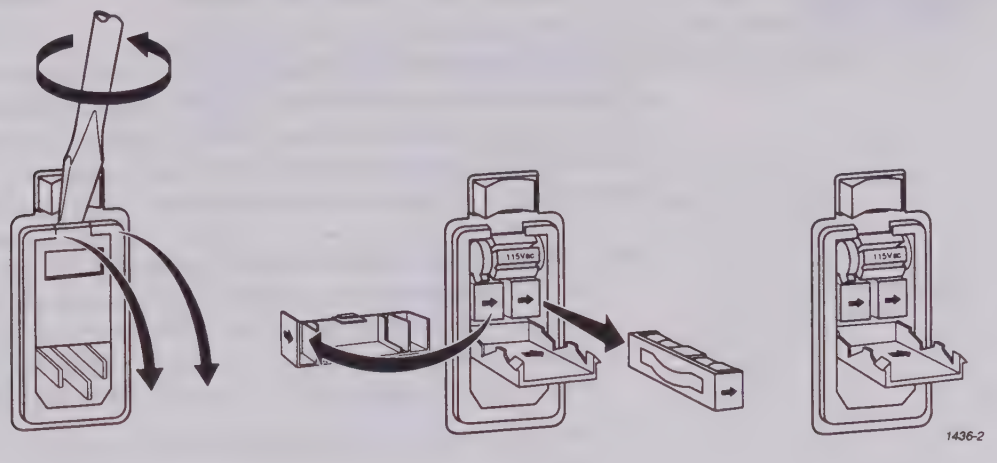


Perform the following procedure to verify that the line fuse is correct and intact.

1. Turn the programmer off and disconnect the power cord and any shielded I/O port cables from the programmer.
2. Remove any installed rail(s) (see the "Disassembling the PSX" on page 7-3). You do not need to remove socket modules from a Memory rail before removing it from the control module.
3. Lift the front of the programmer upwards until the entire bottom cover is visible and the programmer is resting on its back panel.
4. Using a small flat-blade screwdriver, gently pry open the door covering the fuse assembly (see illustration on the next page).

   The PSX has two fuse receptacles. The white receptacle accepts 0.25 x 1.25 in. fuses; the black receptacle accepts 5 x 20 mm fuses.

   Since only the right side of the fuse assembly is connected to the programmer's circuitry, place the fuse receptacle you want to use (white or black) on the right side. Place the other fuse receptacle on the left.



5. Pull out the fuse holder on the right.
6. Examine the right-hand fuse and make sure it is intact. If it is, proceed to step 7. If it is blown, install a new fuse. See the table below for line fuse ratings.

CAUTION: For continued protection against the possibility of fire, replace fuses with fuses of the voltage, current, and type rating specified in the following table.

Fuse Size	Operating Voltage	Current	Line Fuse Rating Voltage/Type	Data I/O Part Number
0.25 x 1.25 in.	115/230	6A	250V/normal blow (F)	416-0003 *
5 x 20 mm	115/230	6A	250V/normal blow (F)	

* *The Data I/O fuse fits only in the white fuse receptacle.*

7. Replace the fuse assembly in the programmer's back panel and snap the door closed.
8. Return the programmer to its upright position and reconnect the power cord (see the "Connecting Power Cord" section on page 2-9) and any shielded I/O port cables (see the "Connecting I/O Port Cables" section on page 2-8).
9. Reinstall the rail(s) as directed in the "Installing Rail(s)" section on page 2-2.
10. Power up the programmer (see the "Turn on the Power" section on page 2-9).

Updating Firmware or Installing a RAM Upgrade

Updating your PSX consists of installing new firmware (devices) in the firmware update sockets and the security device socket. Upgrading your PSX's memory (RAM) consists of installing new 1- or 4-MB SIMMs into memory expansion sockets. This section describes how to install and test your new firmware or SIMMs.

Note: All nonvolatile parameters (port parameters, I/O parameters and verify parameters) saved before powerdown are set to default values upon installation of the new firmware. Make a note of your preferred parameter values prior to installing the update kit, so you can easily reselect them after installing the firmware.

PSX parameters do not change when you install a RAM upgrade.

You need a small slot-head screwdriver to install your RAM upgrade, and a PLCC extractor tool (provided) to install your new firmware.

CAUTION: Firmware is static sensitive. Install your new firmware at an antistatic workstation. To avoid electric shock and damage to the devices, use an antistatic wrist strap that contains a 1 MΩ (minimum) to 10 MΩ (maximum) isolating resistor.

CAUTION: The procedures in this section must be performed by a qualified electronic service technician. Do not attempt to perform these procedures unless you are qualified to do so.

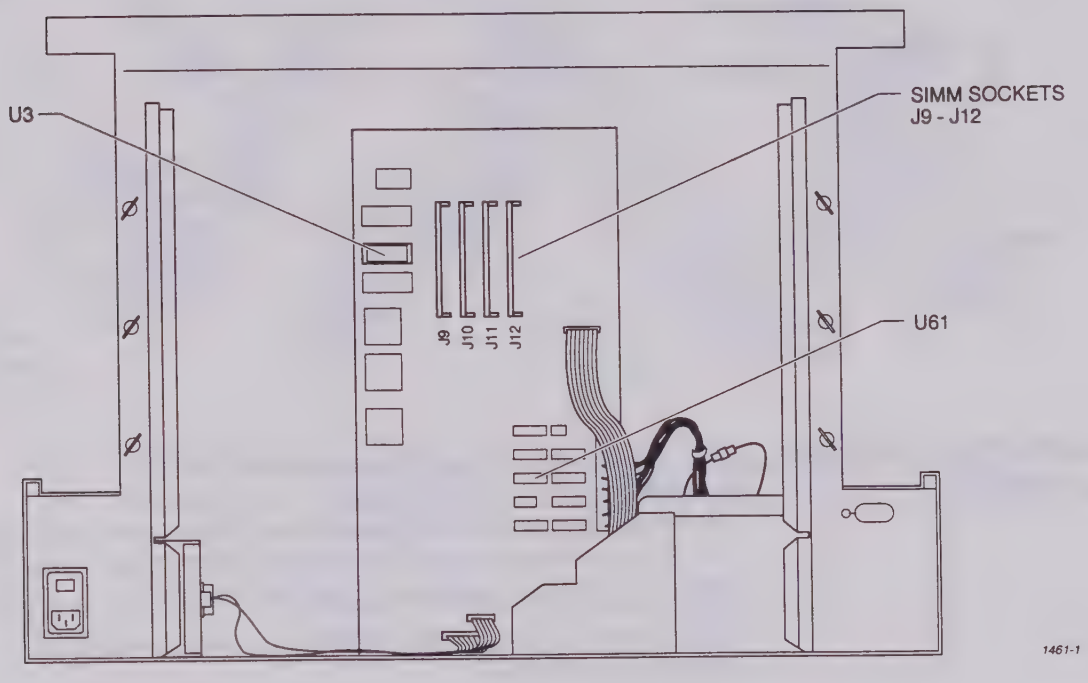
Disassemble the PSX

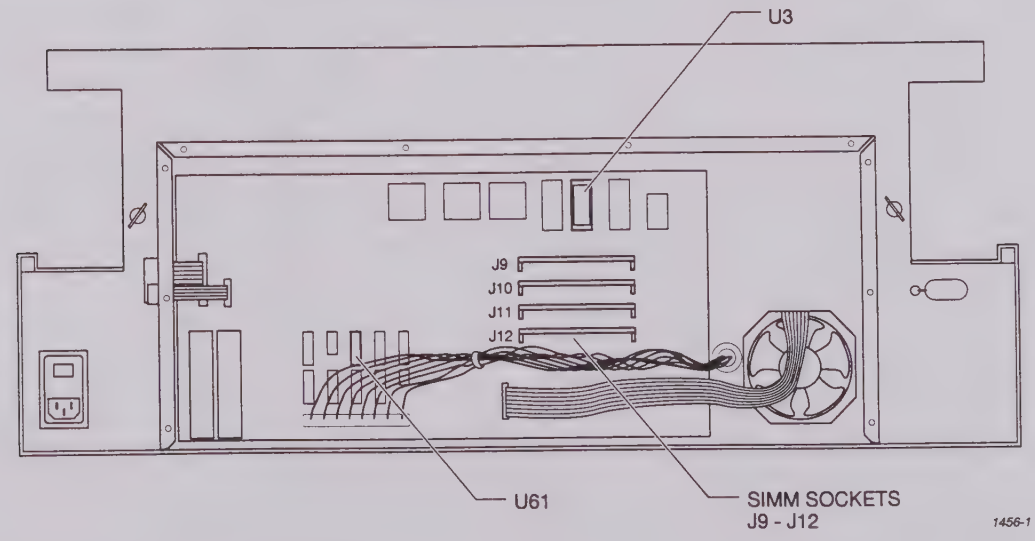
Before you can install a firmware update or a RAM upgrade, you must disassemble the PSX as described on page 7-3 and remove the bottom cover as described on page 7-5.

CAUTION: Be sure to turn off the PSX and disconnect the power cord and any shielded I/O port cables from the PSX before beginning the disassembly process.

Locate Sockets on CPU Board

Remove and install the firmware or SIMMs as follows, referring to the following illustrations for the location of the sockets on the PSX1000 (top illustration) and PSX500 (bottom illustration) CPU boards.

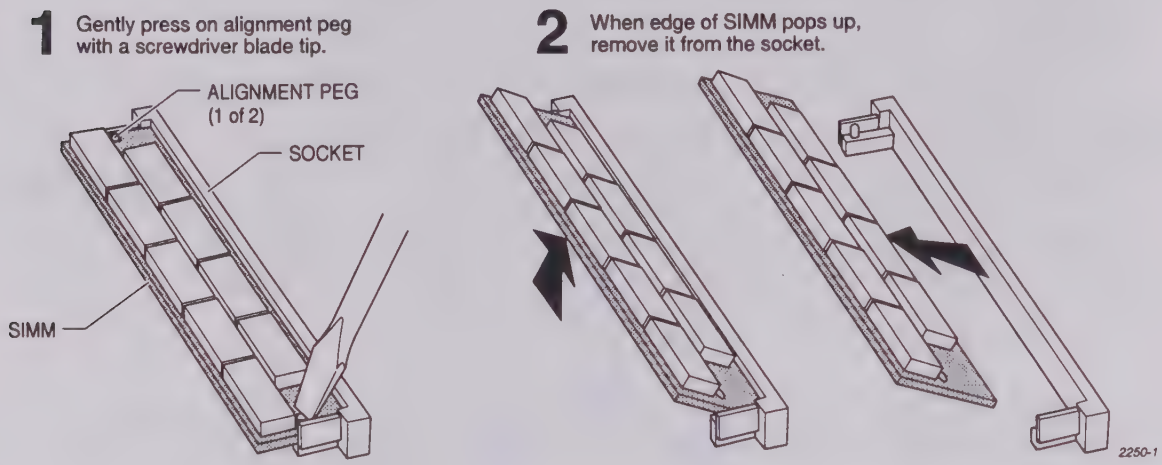




Remove Old Firmware or SIMMs

Firmware Update — With the IC extractor tool or small slot-head screwdriver, remove the firmware from the sockets U3 and U61.

RAM Upgrade — Remove the SIMMs in sockets J9 through J12.



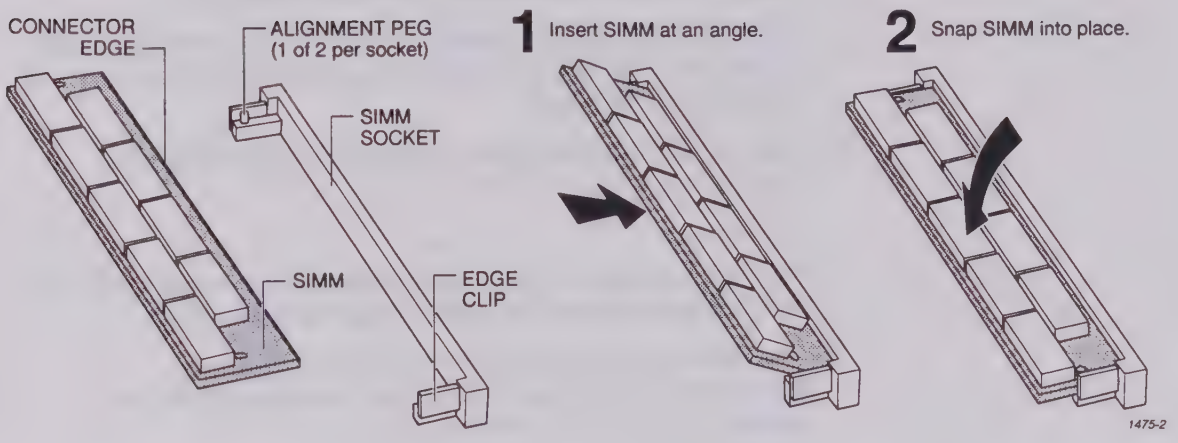
Install New Firmware or SIMMs

Firmware Update – Install the update kit firmware in the locations specified on each device. Make sure that pin 1 (identified by a dot or notch in the end of the device nearest pin 1) is placed where indicated on the socket and that none of the firmware pins are bent during installation.

RAM Upgrade – Install the SIMMs in any of the sockets J1 through J4 as follows:

1. Insert the connector edge of the SIMM.
2. Set the trailing edge of the SIMM onto the alignment pegs on the side of the SIMM socket.

When the SIMM is installed properly, the SIMM rests on the alignment pegs and the edge clips on the socket snap around the SIMM as shown in the following illustration.



Note: You can place SIMMs in any of the four sockets. It does not matter which sockets are used or in what order the SIMMs are placed into the sockets.

Reassemble the PSX

Reassemble the PSX as described on page 7-8.

Perform Powerup Test

The CPU board, module, DMA, timer, DRAM and I/O port are tested during powerup. To perform the powerup test, follow the steps below.

1. Make sure that the rail(s) (and socket modules) are installed and all the sockets are empty, then turn on the PSX.

   As the systems are initialized, the PSX displays several screens that describe the test currently being performed or the error currently encountered.

2. After the PSX has initialized, it beeps twice and displays

   ```
   COPY FROM MASTER
   ```

3. If the PSX completes the powerup routine successfully, attach the label enclosed in the update kit to the back panel.

   If the PSX does not complete the powerup routine successfully, follow the steps in the "Disassemble the PSX" section on page 7-3 and ensure that:

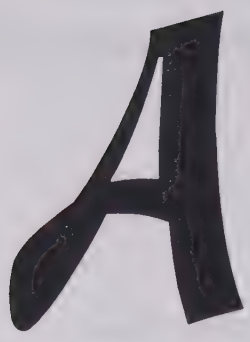
   - None of the firmware pins were bent during installation.
   - Each part was installed in the correct socket (see location designator on each part).
   - Pin 1 on each part is in the location designated for pin 1 by the socket.

   Follow the steps in the "Reassemble the PSX," section above and power up the programmer again. If the self-test fails, call your nearest Customer Support office as listed in Appendix A.

   If the programmer displays a message, see Chapter 6, "Messages," for an explanation.

   If the programmer does not power up, make sure the line fuse is intact. See the "Replacing the Line Fuse" section on page 7-9 for instructions on checking the line fuse.

   The PSX may generate an `Excessive Socket Cycles` message upon powerup. To ensure accurate statistics after replacing the battery, clear the control module statistics as directed in the the "Clear Statistics" section on page 4-43 and the "Clear Socket Cycles" section on page 4-41.



Technical Assistance, Warranty, and Repair

This chapter includes details about contacting Data I/O for technical assistance, repair and warranty services, and Keep Current™ subscription service. The chapter also explains the Bulletin Board Service.

Data I/O Customer Support

United States

For technical assistance, contact

Data I/O Customer Resource Center
Telephone: 800-247-5700
Fax: 206-869-2821

For repair or warranty service, contact

Data I/O Central Dispatch
Telephone: 800-735-6070
Fax: 206-881-0561

For Keep Current subscription service, contact

Data I/O Sales
Telephone: 800-332-8246

Canada

For technical assistance, contact

Data I/O Customer Resource Center
Telephone: 800-247-5700
Fax: 206-869-2821

For repair, warranty service, or Keep Current subscription service, contact

Data I/O Canada
6725 Airport Road, Suite 302
Mississauga, Ontario, L4V 1V2
Telephone: 905-678-0761
Fax: 905-678-7306

United Kingdom

For technical assistance, repair, warranty service, or Keep Current subscription service, contact

Data I/O Limited
660 Eskdale Road
Winnersh, Wokingham
Berkshire RG11 5TS
Telephone: (0)1734-440011
Fax: (0)1734-448700

Japan

For technical assistance, repair, warranty service, or Keep Current subscription service, contact

Data I/O Japan
Osaki CN Building 2F
5-10-10, Osaki Shinagawa-Ku
Tokyo 141
Telephone: 3-3779-2152
Fax: 3-3779-2207 (Operations)
3-3779-2203 (Other)

Germany

For technical assistance, repair, warranty service, or Keep Current subscription service, contact

Data I/O GmbH
Lochhamer Schlag 5a
82166 Gräfelfing
Telephone: 089-858580
Fax: 089-8585810

Other European Countries

For technical assistance, repair, warranty service, or Keep Current subscription service, contact the office below and ask for the number of your local Data I/O representative.

Data I/O Europe
660 Eskdale Road
Winnersh, Wokingham
Berkshire RG11 5TS
United Kingdom
Telephone: 44-(0)1734-448899
Fax: 44-(0)1734-440070

Other Countries Worldwide

For technical assistance, repair, warranty service, or Keep Current subscription service, contact the office below and ask for the number of your local Data I/O representative.

Data I/O Intercontinental
10525 Willows Road N.E.
P.O. Box 97046
Redmond, WA USA 98073-9746
Telephone: 206-881-6444
Fax: 206-882-1043
Telex: 4740166

Technical Assistance

You may contact Data I/O for technical assistance by calling, sending a fax or electronic mail (e-mail), or using the Bulletin Board Service (BBS).

To help us give you quick and accurate assistance, please provide the following information:

- Product version number
- Product serial number (if available)
- Detailed description of the problem you are experiencing
- Error messages (if any)
- Device manufacturer and part number (if device-related)

Calling

Call the appropriate Data I/O Customer Support number listed at the front of Appendix A.

When you call, please be at your programmer or computer, have the product manual nearby, and be ready to provide the information listed above.

Sending a Fax

Fax the information listed above with your name, phone number, and address to the appropriate Data I/O Customer Support fax number listed at the front of this chapter.

Sending E-mail

To reach Data I/O via e-mail, send a message including your name, phone number, e-mail address, and the information listed above to one of the following addresses:

```
techhelp@Data-IO.COM
```

or

```
{apple|decwrl|rutgers|gatech|uunet}!pilchuck!techhelp
```

Note: Select one of the five addresses listed above in braces. For example, you might send e-mail to the following address: `uunet!pilchuck!techhelp`.

See your system administrator if you need more information on which address to use.

Using the BBS

To reach Data I/O via the BBS, include your name, phone number, e-mail address, and the information listed above in a message, and send it to the BBS as described in the following section.

Bulletin Board Service

From the Data I/O Bulletin Board System (BBS) you can obtain a wide range of information on Data I/O products, including current product descriptions, new revision information, technical support information, application notes, and other miscellaneous information.

Using the BBS, you can access device support information, request support for a particular device, and leave messages for the BBS system operator, Customer Support personnel, or other customers. The BBS also includes many downloadable DOS utilities.

Multiple lines are available, all supporting 1200/2400/9600/19200 baud, with U.S. Robotics Dual/HST V.32*bis*/V.42*bis* modems. The modems are set to 8 data bits, 1 stop bit, and no parity. Online help files provide more information about the BBS and its capabilities.

BBS numbers for all countries are as follows:

Country	BBS Number
Belgium	+32-(0)1-6380731
Canada	+1-905-678-0547
France	+33-(0)13-9562699
Germany	+49-(0)89-8585833
Japan	+81-33779-2240
Netherlands	+31-(0)40-582424
Norway	+47-(0)66-780445
Sweden	+46-(0)8-7391037
Switzerland	+41-(0)1-313-0658
United Kingdom	+44-(0)1734-448862
United States	+1-206-882-3211

Warranty Information

Data I/O Corporation warrants this product against defects in materials and workmanship at the time of delivery and thereafter for a period of one (1) year.

The foregoing warranty and the manufacturers' warranties, if any, are in lieu of all other warranties, expressed, implied or arising under law, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

Data I/O maintains customer service offices throughout the world, each staffed with factory-trained technicians to provide prompt, quality service. For warranty service, contact Data I/O Customer Support at the numbers listed at the front of this chapter.

Keep Current Subscription Service

Data I/O offers a one-year renewable subscription to keep your product and documentation up-to-date with the latest features and device support. This subscription, called Keep Current subscription service, also incorporates manufacturer-recommended changes to existing device support to maintain optimum yields, throughput, and long-term reliability.

For more information, or to order Keep Current subscription service, contact Data I/O Customer Support at the numbers listed at the front of this chapter.

Repair Service

After the warranty period expires, repair services are available at Data I/O Service Centers on a time-and-materials basis, and through a fixed price annual agreement that covers all parts and labor needed to correct normal malfunctions. The annual agreement includes semiannual performance certification.

For more information, or to order a Repair Service Agreement, contact Data I/O Customer Support at the numbers listed at the front of this chapter.

User Registration and Address Change

If the end user for this product or your address has changed since the Registration Card was mailed, please notify Data I/O Customer Support at the numbers listed at the front of this chapter. This ensures that you receive information about product enhancements. Be sure to include the product serial number, if available.

B Using an IEEE-488 Interface

The PSX can interface with a PC using either a standard RS232 9-pin cable or an IEEE-488 cable. This appendix describes how to install and use the IEEE-488 interface.

When the PSX is connected to a PC using a standard RS232C port, data is transferred at 9600 baud. The PSX can also be configured with a PC-mounted IEEE-488 port. This port dramatically increases the file download speed and functionality of the programmer, while potentially increasing the complexity of the host PC to programmer link.

Note: In this section, a machine that supports IEEE functions in a dedicated or bus application is referred to as a device.

Installation

An IEEE-488 interface board must be installed in your PC in order to communicate with an IEEE-488 compatible machine (such as the IEEE-488 version of the PSX). The following instructions briefly describe how to install and set up your IEEE interface. For more complete setup and installation instructions, refer to the document *TaskLink IEEE-488 Interface* (980-0050-*xxx*) included with your TaskLink package.

To install the interface board, do the following:

Note: To install the IEEE board, your PC needs at least one available ISA-compatible 16-bit or larger socket.

1. Turn off the power to your PC, PSX, and all PC peripherals.
2. Unpack and install your IEEE board as directed in the documentation that was included with the board. For information on how to install a board into your PC, refer to the instructions that came with your PC.

   The PSX supports the default switch settings of the IEEE board. (This is the 7210 configuration.)
3. If it has not already been done, install TaskLink software or a custom CRC driver program onto your PC. TaskLink installation is described in the *TaskLink User Manual*.
4. Install the IEEE option software by doing the following:

   a. If you have already connected the IEEE cable to your PC, disconnect the cable.

b. Insert the **IEEE Option** disk into a disk drive on your PC.

c. Enter

a: install

where *a* is the drive in which you placed the disk. Follow the instructions on the screen, answering any prompts.

d. After software installation, reboot your PC.

5. At the DOS prompt, enter **ibtest** to test the IEEE board and your system. (The **ibdiag** program can be used to further diagnose any compatibility problems. **ibdiag** is described in the *Getting Started with Your GPIB-PCII/IIA and the NI-488.2 Software for MS-DOS* manual included with the board.)

6. Set up your PSX for IEEE operation by doing the following:

a. Attach the appropriate rail(s) and socket modules.

b. Turn on the power to the PSX.

c. After the powerup test, use the arrow keys to scroll to `SET PORT OPTIONS` and press ENTER.

d. From the `Set Port Options` menu, set the `Active Port =` to **IEEE488**.

e. From the `Set Port Options` menu, set the `HW Translators =` to **ON**.

f. From the `Remote Control` menu, set `Remote On/Off =` to **00 00**.

g. Select `Remote Control` again. Small $^{r}{}_{c}$ characters should appear in the upper left-hand corner of the display indicating that the programmer is in CRC.

7. Attach the IEEE-488 cable.

8. Set up the programmer type and programmer port settings for your interface software (such as TaskLink).

Installing Multiple Devices

Each IEEE-488 interface board supports up to 16 devices. The interface board permits devices on the bus to be individually addressed, with independent "talk" and "listen" modes.

Each interface board is provided with one IEEE-488 connector that attaches to a matching cable containing a male/female stacking connector. To use more than one device (up to 16 devices), connect cables to the stacking connector (in effect, *daisy-chaining* multiple devices to one interface board).

Installing Multiple Boards

Using National Instruments IEEE boards, you can install up to four boards in your PC; each board supports up to 16 devices.

Using the IEEE-488 Connection

The IEEE-488 interface board takes commands and data from the PC, and transmits them in parallel format via an IEEE-488 cable to the device(s), and conversely, can receive responses and data from the device(s) and transfer them to the host system.

The IEEE-488 compatible software used in conjunction with the interface board typically provides for system configuration, applications monitoring, and user-application program language interfaces such as C, BASIC, and Universal Language Interface. IEEE-488 bus devices can be operated with this software using strings of individual system and device-specific commands to the interface board. However, it is easier to use a user-application program for communication between the host PC, interface board, and the programmer.

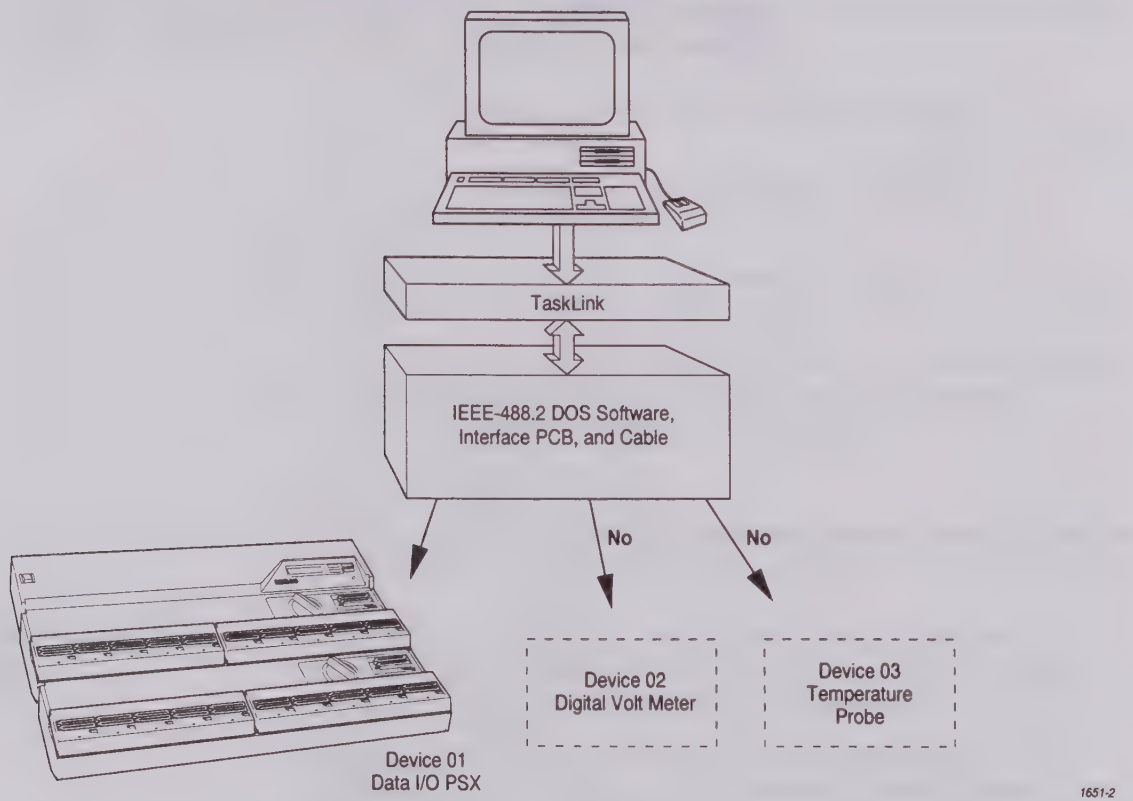
Using IEEE-488 protocol, the programmer can be set up as a dedicated application controlled by TaskLink software, or as a bus application using an IEEE-488 standard interface board and software.

The PSX as a Dedicated Application (TaskLink)

Each IEEE-488 device (for example, instrument, probe, or programmer) has a unique command set and therefore requires that you write a user-application program that can communicate with the NI-IEEE MS-DOS software through a language interface.

TaskLink includes a user-application program for the PSX programmer and is able to pass the appropriate Data I/O computer remote control (CRC) command set to the programmer. TaskLink is configured for IEEE-488 operation by first selecting the PSX as the target programmer in the **Options: Programmer Type** menu, then selecting IEEE-488 in the **Options: Programmer Port** menu. This setup allows TaskLink to pass most CRC commands and data formats over the IEEE link to the programmer, but does not allow TaskLink to control any device other than the PSX programmer. This relationship is illustrated in Figure B-1.

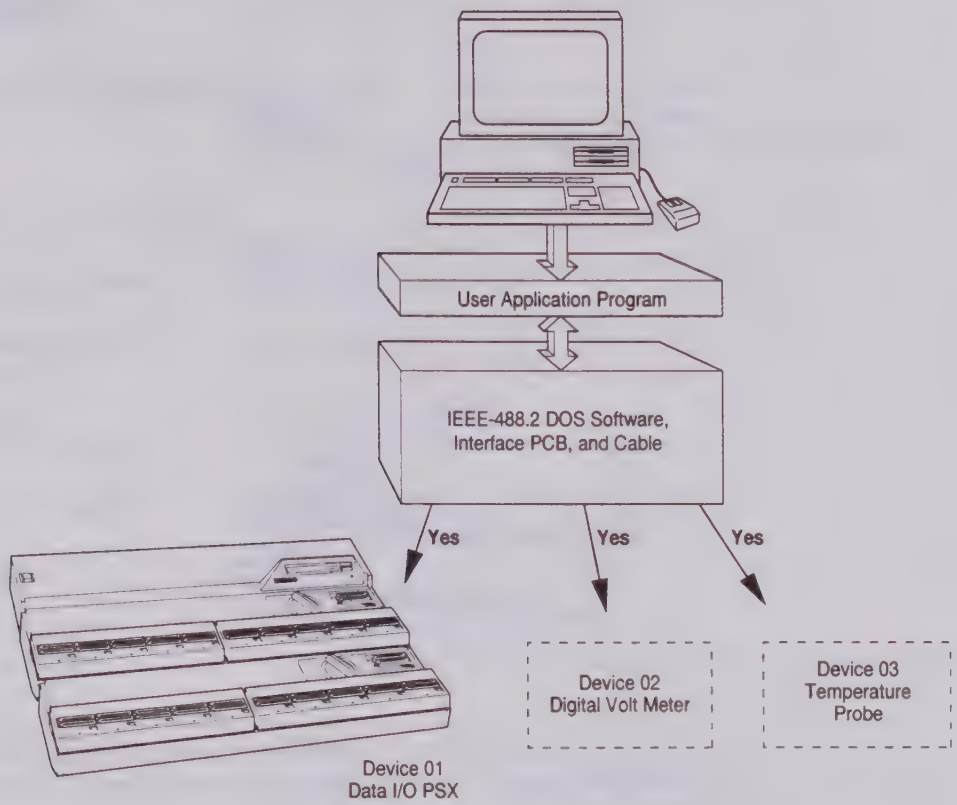
Figure B-1
Dedicated Application – TaskLink/IEEE/PSX



The PSX as an IEEE-488.2 Bus Device (National Instruments)

The PSX can be operated as one of many devices on an IEEE-488 standard bus. You must write additional software in the form of a user application program (see Figure B-2).

Figure B-2
Bus Application – User Application Program/IEEE/the PSX and other devices

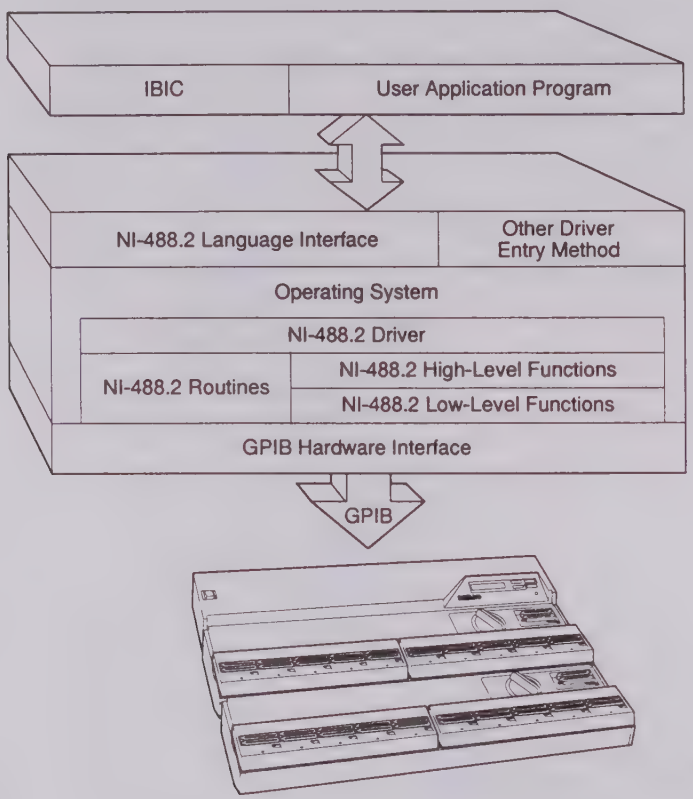


Successful IEEE-488 communication between your computer and the PSX may involve several sets of interactive handshakes and translations as shown in Figure B-3. The general IEEE-488 protocol for the transfer of one command from the host PC to the programmer via the IEEE-488 interface is listed below. The last two commands are programmer specific. The balance of the command set is the necessary protocol for the IEEE-488 interface.

- Universal untalk
- Universal unlisten
- Host PC primary talk address
- The PSX primary listen address
- Send command
- Transfer data (if required)

Depending on the user requirements, additional programmer commands may be sent, or the sequence terminated and an alternative mode initiated.

Figure B-3
National Instruments IEEE-488.2 (courtesy of National Instruments)



Note: For more useful information on writing your own IEEE-488 interface, contact National Instruments' anonymous FTP site at **ftp.natinst.com**.

Summary

Using an IEEE-488 port with the PSX programmers offers a substantially higher rate of data transfer than using a standard RS-232C port. Using Data I/O TaskLink software in an IEEE-488 dedicated application simplifies programmer use while limiting the IEEE-488 system to a single device configuration.

Configuring the PSX as one of many devices in an IEEE-488 bus application requires additional cost and effort in system setup, and substantially increases the complexity of the user environment.

C Specifications

This appendix contains the PSX product line specifications, factory default settings, and safety information.

Specifications

The PSX product line specifications are listed below.

Power Requirements

Voltage Range	100 to 240V ac ± 10%
Frequency Range	47 to 63 Hz
Power Consumption	500 VA maximum 350 Watts maximum
Input Current	5A maximum

Physical

Control Modules	**PSX1000**	
	Dimensions:	81w x 27h x 61d cm (32w x 10.75h x 24d in.)
	Weight:	12.34 kg (27 lb, 3 oz)
	PSX500	
	Dimensions:	81w x 16h x 36d cm (32w x 6.3h x 14.2d in.)
	Weight:	13.05 kg (28 lb, 12 oz)
Rails	**Memory**	
	Dimensions:	81w x 9h x 22d cm (32w x 3.5h x 8.5d in.)
	Weight:	6 kg (13 lb, 4 oz)
	Micro	
	Dimensions:	81w x 9h x 22d cm (32w x 3.5h x 8.5d in.)
	Weight:	6.5 kg (14 lb, 4.5 oz)
	28-pin	
	Dimensions:	81w x 9h x 22d cm (32w x 3.5h x 8.5d in.)
	Weight:	6.5 kg (14 lb, 4.5 oz)

Socket Modules

Dimensions

All socket modules are the same dimensions across the front (width) and from the front to the back (depth). The only dimension that varies (because of the sockets) is the height.

The dimensions of a socket module without sockets are: 40.23w x 5.04h x 8.94d cm (15.84w x 1.986h x 3.518d in.)

The table below lists the height of each socket module.

Socket Module	Height Centimeters	Inches
DIP48	5.219	2.055
32PLCC(28)	5.750	2.264
32PLCC(28)HT	7.236	2.849
32PLCC(32)	5.750	2.264
32PLCC(32)HT	7.236	2.849
44PLCC	5.770	2.272
44PLCCHT	7.335	2.888
68MEMCARD	12.760	5.024
28SOIC-300	5.971	2.351
28SOIC-330	5.984	2.356
32SOIC-440	5.974	2.352
40SOIC-450	6.024	2.372
44SOIC-530	5.694	2.242
28TSOP	5.699	2.244
32TSOP	5.626	2.215
40TSOP	5.626	2.215
48TSOP	5.626	2.215
56TSOP	5.626	2.215
MICRO-DIP48	5.219	2.055
MICRO-44PLCC	7.335	2.888
MICRO-52PLCC	7.430	2.925
MICRO-64QFP	5.908	2.326

Weight

In general, all socket modules weigh 0.85 kg (1 lb, 14 oz). The 68MEMCARD socket module weighs 1.08 kg (2 lb 6 oz).

Functional

Keyboard 4-key keypad

Display 2-line, 48-character alphanumeric

Serial I/O RS-232C with the following supported baud rates: 50, 75, 110, 134.5, 150, 200, 300, 600, 1050, 1200, 1800, 2000, 2400, 4800, 9600, 19.2K, and 38.4K.

Parallel I/O	IEEE-488, complying with IEEE-488 Standard 488-1978 and 1980 supplement. High speed data transfer rate using 8 data and 8 bus management lines, up to 120 kilobytes per second. EMI shielded IEEE-488 connector.
Translation Formats	There are 43 translation formats available for the PSX programmers (see the **Set I/O Options: Format** menu shown on page 4-54).

Environmental

Temperature	**Operating** +5° to 45°C (41° to 113°F) **Storage** -40° to 70°C (-40° to 158°F)
Humidity	To 90% non-condensing
Altitude	**Operating** To 5000 m (16000 ft) **Storage** To 8500 m (28000 ft)

Safety

The PSX complies with the following safety standards:

Underwriters Laboratories	UL 1950
Canadian Standard Association	CSA C22.2 No. 231
International Electrotechnical Commission	IEC 348 and IEC 1010-1
Verband Deutscher Electrotechniker	VDE 0411

Electromagnetic Interference

PSX programmers are certified to meet VDE 0871 Limit B (vfg 1046).

PSX programmers are certified to meet Federal Communications Commission (FCC) Part 15, Class B.

Electrostatic Discharge (ESD)

IEC 801-2 (± 15 kV)

Factory Default Settings

Category	Option Name	Default Setting*
Device	Electronic ID	On
	Device Test	On
	Security Setting	Array
	Checksum Calculation	On
	Checksum Display Width	8 digits
	Checksum Calculation Mode	Bytewise
	Attribute Memory	On
Verify	Number of Verify Passes	2
	Voltage Levels	Manufacturer-recommended
Operation	Beeper Pitch	7
	Setsize	1
	Bitsize	8
	Device Insertion Test	Continue
	Blank Check	Continue
	Illegal Bit Test	Continue
	Rail Mode	Parallel
	Open Socket LED	Red
Port	Active Port	Serial
	Baud Rate	9600
	Parity	Off
	Stop Bit	1
	SmartPort	On
	Hardware Translators	On
I/O	I/O Format	Intel MCS
	Address Offset	First Address Downloaded
	Handshake Option	0
	Timeout	30
	CRC Code	00 00 (Off)
RAM	DataLock	Off
	Beginning RAM Address	000000
	Block Limit	Device Size
	Word Order	Low/High

** Default settings can be changed and are saved on powerdown (see page 3-18).*

Safety Summary

This summary contains general safety information for operating personnel. In addition, specific **WARNINGS** and **CAUTIONS** appear throughout this manual where they apply and are not included in this summary.

Antistatic Wrist Strap

To avoid electric shock, the antistatic wrist strap must contain a 1 MΩ (minimum) to 10 MΩ (maximum) isolating resistor.

Definitions

WARNING statements identify conditions or practices that could result in personal injury or loss of life. **CAUTION** statements identify conditions or practices that could result in damage to equipment or other property.

Grounding the Product

The product is grounded through the grounding conductor of the power cord. To avoid electric shock, plug the power cord into a properly wired and grounded receptacle only. Grounding this equipment is essential for its safe operation.

Power Cord

Use only the power cord specified for your equipment.

Power Source

To avoid damage, operate the equipment only within specified line (ac) voltage.

Servicing

To reduce the risk of electric shock, perform only the servicing described in this manual.

Symbols

This symbol on equipment indicates that the user should consult the manual for further detail.

V~ This symbol stands for V ac, for example, 120 V~ = 120V ac.

This symbol denotes a fuse rating for a user-replaceable fuse.

This symbol denotes the protective ground connection.

This symbol denotes a ground connection for a signal or for an antistatic wrist strap with impedance of 1 MΩ (minimum) to 10 MΩ (maximum).

Certificate of Compliance with FCC Part 15, Class B

Data I/O certifies that this product is designed to comply with Part 15, Class A and the more stringent Class B limits of the Federal Communications Commission rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the User Manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case, the end user will be required to correct the interference at their own expense.

Do not modify the PSX400 programmers or operate them without properly shielded I/O Cables (such as the cable supplied with your equipment). Modifying the PSX400 in any way not expressly authorized by Data I/O or using it without a proper I/O cable could void your authority to operate this equipment under FCC compliance.

Zusammenfassende Sicherheitsinformationen

Diese Zusammenfassung enthält allgemeine Sicherheitsinformationen für das Bedienerpersonal. Zusätzlich erscheinen, wenn zutreffend, ausdrückliche Hinweise (ACHTUNG!, VORSICHT!) im Verlauf des Textes. Diese Hinweise werden in dieser Zusammenfassung nicht wiederholt.

Antistatik-Armband

Zum Schutz gegen Stromschläge muß das Antistatik-Armband einen Isolierwiderstand von minimal 1MΩ und maximal 10MΩ enthalten.

Definitionen

Mit **ACHTUNG!** ("WARNING") überschriebene Hinweise dienen zur Identifizierung und Warnung vor Zuständen oder Vorgängen, die Verletzungen oder Tod herbeiführen können. **VORSICHT!** ("CAUTION") dient zum Hinweis auf Zustände und Schritte, die zu Geräte-oder andersartigen Sachschäden führen können.

Erdung des Gerätes

Das Gerät wird durch den dritten Leiter des Netzkabel geerded. Stecken Sie die Netzschnur zur Vermeidung von Stromschlägen nur in eine geerdete Steckdose. Richtige Erdung ist für den problemfreien Betrieb dieses Gerätes unerläßlich.

Netzkabel

Verwenden Sie nur die für dieses Gerät vorgesehene Netzkabel.

Stromquelle

Vermeiden Sie Beschädigungen des Gerätes durch den Betrieb an der vorgeschriebenen Wechselspannung.

Wartung/Reparatur

Führen Sie zum Vermeiden von Stromschlägen nur die in diesem Handbuch erwähnten Wartungsarbeiten durch.

Symbole

Dieses Symbol bedeutet, daß das Handbuch weitere dem Bediener hilfreiche Hinweise enthält.

V~ Dieses Symbol bedeutet V ac (Volt Wechselstrom); z.B. 120V~ = 120V ac.

Dieses Symbol bezeichnet Sicherungsdaten für vom Bediener auszuwechseinde Sicherungen.

Dieses Symbol bezeichnet eine Schutzerde-Verbindung.

Dieses Symbol bezeichnet eine Masseverbindung für ein Signal oder ein Antistatik-Armband mit einer Impedanz von 1 MΩ (min) bis 10 MΩ (max).

Résumé des consignes de sécurité

Ce résumé comprend les informations relatives à la sécurité pour les opérateurs. De plus, tout au long de ce manuel, on retrouve aux endroits appropriés, des **MISES EN GARDE** et des **AVERTISSEMENTS** spécifiques qui ne sont pas inclus dans ce résumé.

Bracelet antistatique

Afin d'éviter tout choc électrique, le bracelet antistatique doit renfermer un résistor de 1MΩ (minimum) à 10MΩ (maximum).

Définitions

Les indications de **MISE EN GARDE** ("WARNING") signalent les conditions ou pratiques qui pourraient causer des blessures corporelles ou la mort. Les indications d'**AVERTISSEMENTS ("CAUTION")** signalent les conditions ou pratiques qui pourraient endommager l'équipement ou entraîner d'autres dommages matériels.

Mise à la terre du produit
Le produit est mis à la terre par l'entremise de la borne de mise à la terre du cordon d'alimentation. Pour éviter tout choc électrique, il faut brancher le cordon d'alimentation uniquement dans un réceptacle mis à la terre correctement et dont les fils ont été rattachés correctement. Il est essentiel de mettre cet appareil à la terre pour qu'il puisse fonctionner sans danger.

Cordon d'alimentation
N'utiliser que le cordon d'alimentation spécifié pour votre appareil.

Source d'alimentation
Pour éviter d'endommager l'appareil, il faut respecter la tension (ca) spécifiée.

Service
Afin de réduire les risques de choc électrique, il faut s'en tenir aux opérations d'entretien et de réparation spécifiées dans ce manuel.

Symboles

Ce symbole indique que l'utilisateur doit consulter le manuel pour obtenir de plus amples détails.

V∿ Ce symbole représente le voltage en courant alternatif V ca, par exemple, 120 V ∿ = 120 V ca.

Ce symbole indique la valeur nominale d'un fusible remplaçable par l'utilisateur.

Ce symbole indique la connexion d'isolation à la masse.

Ce symbole indique une connexion de masse pour un signal ou un bracelet antistatique avec une impédance de 1 MΩ (minimum) à 10 MΩ (maximum).

Riepilogo di sicurezza
Questo riepilogo contiene informazioni di sicurezza per il personale addetto alle operazioni. Inoltre, specifiche note di **ATTENZIONE** e di **AVVISO** relative al contesto fanno parte di questo manuale e non sono state ripetute in questo riepilogo.

Cinghia antistatica da polso
Per evitare le scosse elettriche, la cinghia antistatica da polso deve contenere un resistore di isolamento da 1MΩ (minimo) a 10MΩ (massimo).

Definizioni
Le note di **ATTENZIONE ("WARNING")** identificano condizioni o procedure che potrebbero causare infortuni personali o decessi. Le note di **AVVISO** ("CAUTION") identificano condizioni o procedure che potrebbero causare danni all'equipaggiamento o ad altra proprietà.

Messa a terra del prodotto
Il prodotto viene messo a terra tramite il conduttore della messa a terra del cavo elettrico. Per evitare scosse elettriche, innestare il cavo elettrico in una presa correttamente cablata e messa a terra. La messa a terra di questo equipaggiamento è essenziale per un funzionamento sicuro.

Cavo elettrico
Usare solo il cavo elettrico specificato per l'equipaggiamento.

Fonte di alimentazione
Per evitare danni, operare l'equipaggiamento solo entro la tensione (ca) di linea specificata.

Manutenzione
Per ridurre il rischio di scossa elettrica, svolgere solo la manutenzione descritta in questo manuale.

Simboli

Questo simbolo indica che l'utente deve consultare il manuale per ulteriori dettagli.

V∿ Questo simbolo indica V ca, ad esempio, 120V ∿ = 120 V ca.

Questo simbolo indica la capacità nominale di un fusibile che può venire sostituito dall'utente.

Questo simbolo contrassegna la messa a terra di protezione.

Questo simbolo contrassegna una messa a terra per un segnale o per un cinturino da polso antistatico con impedenza compresa tra 1 MΩ (minimo) e 10 MΩ (massimo).

Resumen de seguridad
En este resumen se proporciona información general sobre seguridad para el personal operario. Además, aparecen notas de **ADVERTENCIA** y **CUIDADO** por todo el manual, donde son apropiadas y no se incluyen en este resumen.

Muñequera antiestática
Para evitar descargas eléctricas, la muñequera antiestática debe contener un resistor aislante de 1 MΩ (como mínimo) a 10 MΩ (como máximo).

Definiciones
Las notas de **ADVERTENCIA** ("WARNING") identifican condiciones o prácticas que pudieran dar como resultado lesiones personales o pérdida de la vida. Las notas de **PRECAUCION** ("CAUTION") identifican condiciones o prácticas que pudieran dar como resultado daños en equipos u otras propiedades.

Conexión a tierra del producto
El producto se conecta a tierra por medio del conductor de masa del cable de alimentación. Para evitar descargas eléctricas, enchufe el cable de alimentación en un receptáculo alambrado y conectado a tierra de modo correcto.

Cable de alimentación
Use sólo el cable de alimentación especificado para el equipo de que se trate.

Fuente de alimentación
Para evitar daños, haga funcionar el equipo sólo dentro de los voltajes de línea especificados (de ca).

Servicios
Para reducir los riesgos de que se produzcan descargas eléctricas, lleve a cabo sólo los servicios descritos en este manual.

Símbolos

Este símbolo indica que el usuario debería consultar el manual para obtener más detalles.

V∿ Este símbolo representa V ca. Por ejemplo, 120 V ∿ = 120V ca.

Este símbolo denota un valor nominal para un fusible reemplazable por el usuario.

Este símbolo indica la conexión a tierra de protección.

Este símbolo equivale a una conexión a tierra para una señal o una banda pulsera de antiestática con una impedancia de 1 MΩ (mínima) a 10 MΩ (máxima).

Service

This chapter is a supplement to Chapter 7, "Maintenance," and includes the following sections:

Socket Warranty and Replacement D-2

Replacing Socket Module Sockets:
DIP48 . . . . . D-3
PLCC, SOIC, TSOP, and QFP (socket board replacement) D-7
PLCC (socket replacement – hinged-top) D-10
68MEMCARD D-13

Replacing Rail Sockets:
Micro and 28-pin Rails D-17
Master Socket D-21

Calibrating the PSX D-24

CAUTION: The procedures in this chapter must be performed by a qualified electronic service technician. Do not attempt to perform these procedures if you are not qualified to do so.

Reducing Electrostatic Discharge

To reduce electrostatic discharge, you should ground the programmer to a grounded antistatic workstation and wear a wrist strap that is connected to the same antistatic workstation. An ambient temperature of 18° to 28°C (64.4° to 82.4°F) and relative humidity less than 85% should be maintained.

WARNING: To avoid electric shock, use an antistatic wrist strap that contains a 1 MΩ (minimum) to 10 MΩ (maximum) isolating resistor.

If you do not have an antistatic workstation available, wear an antistatic wrist strap and connect it to the PSX's wrist strap connector on the right side of a rail.

For more information, refer to "Reducing Electrostatic Discharge" on page 7-2.

Disassembling the PSX

For instructions on how to disassemble the PSX, refer to "Disassembling the PSX" on page 7-3.

WARNING: Disassembling the programmer when power is applied can cause severe electric shock.

Spare Parts

Spare parts are available from Data I/O. Call the Service Dispatch Group at 800-735-6070 to request spare parts.

Socket Warranty and Replacement

When the sockets have reached the warranted number of insertion cycles per socket, the PSX generates the following message:

```
Excessive socket cycles
ENTER to continue
```

You should replace the sockets and clear socket cycles (see the "Statistics" section starting on page 4-40) at this interval. You may want to order socket replacement kits ahead of time so you have them on hand when you need them. If you have not done so already, contact your nearest Customer Support office as listed in the Preface to order a socket replacement kit.

Table D-1 lists the warranties and socket replacement kit part numbers for socket module sockets. Table D-2 lists the warranties and socket replacement kit part numbers for rail sockets.

Table D-1
Socket Module Socket Warranties and Replacement Kit Part Numbers

Socket Module	Warranty (insertion cycles per socket)	Socket Replacement Kit Part Number
DIP48	25,000	952-0110
32PLCC(28)	5,000	952-0064
32PLCC(28)HT	10,000	952-0112
32PLCC(32)	5,000	952-0065
32PLCC(32)HT	10,000	952-0111
44PLCC	5,000	952-0066
44PLCCHT	10,000	952-0113
68MEMCARD	10,000	952-0108
28SOIC-300	10,000	952-0104
28SOIC-330	10,000	952-0103
32SOIC-440	10,000	952-0105
40SOIC-450	10,000	952-0106
44SOIC-530	10,000	952-0107
28TSOP	10,000	952-0128
32TSOP	10,000	952-0109
40TSOP	10,000	952-0129
48TSOP	10,000	952-0146
56TSOP	10,000	952-0130
MICRO-DIP48	25,000	952-0110
MICRO-44PLCC	10,000	952-0148
MICRO-52PLCC	25,000	952-0149
MICRO-64QFP	10,000	952-0147

Table D-2
Rail Socket Warranties and Replacement Kit Part Numbers

Rail Sockets	Warranty (insertion cycles per socket)	Socket Replacement Kit Part Number
Micro or 40-pin	25,000	952-0012
28-pin	25,000	952-0011

Socket Replacement for DIP48 Socket Modules

This section describes how to replace sockets in your DIP48 socket module.

CAUTION: ***The procedures in this section must be performed by a qualified electronic service technician. Do not attempt to perform these procedures if you are not qualified to do so.***

WARNING: Disassembling the programmer when power is applied can cause severe electric shock.

CAUTION: ***Removing or installing rails or socket modules when power is applied to the programmer can damage the programmer, rails, and socket modules and voids the warranty.***

Package Contents

The socket replacement kit contains the hardware to replace the sockets in your DIP48 socket module. The kit includes five sockets.

Disassembly

To replace the DIP48 socket module board assembly, you need the following tools:

- Antistatic workstation
- Antistatic wrist strap

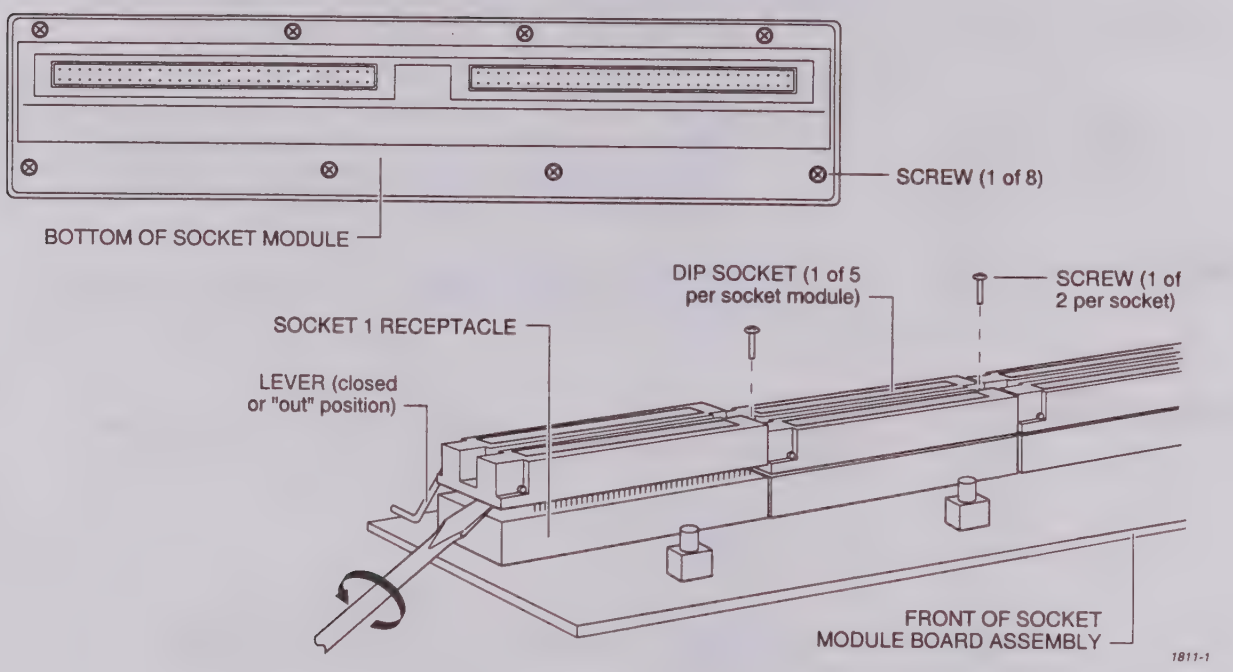
  To avoid electric shock, use an antistatic wrist strap containing a 1 MΩ (minimum) to 10 MΩ (maximum) isolating resistor.
- Phillips screwdrivers
- Flat-blade screwdriver
- Needle-nose pliers

1. Power down the programmer.
2. Place the dial in the **open** position.

Note: Socket modules cannot be removed when the dial is in the closed position.

3. Firmly grasp the socket module and pulling straight up, remove the socket module from the Memory rail.
4. Turn the socket module over on the antistatic workstation so the sockets and LEDs are down and the LEDs are toward you.
5. Using a Phillips screwdriver, remove the eight screws securing the bottom cover to the top cover (see Figure D-1).

Figure D-1
DIP48 Socket Module Disassembly


SCREW (1 of 8)
BOTTOM OF SOCKET MODULE
DIP SOCKET (1 of 5 per socket module)
SCREW (1 of 2 per socket)
SOCKET 1 RECEPTACLE
LEVER (closed or "out" position)
FRONT OF SOCKET MODULE BOARD ASSEMBLY
1811-1

6. Remove the bottom cover.
7. Remove the socket module board assembly from the top cover. Set the top cover aside.
8. Remove the socket actuator slide from the upper edge of the socket module board assembly.

Removing Old Sockets

1. Set the socket module board assembly on the antistatic workstation with the LEDs toward you and the socket levers away from you.

CAUTION: For the next step, make sure you use a Phillips screwdriver that fits the screw head. Using a screwdriver that is too large could strip the screw head.

2. Using a Phillips screwdriver, completely loosen the screws at each end of each socket with firm downward pressure on the screwdriver. It is not necessary to remove the screws; they will lift out when you lift the socket out. Loosen the screws on all the sockets.
3. Using the flat-blade screwdriver and working alternately at several points around the socket 1 (the far left socket — see Figure D-1), gently separate the socket from the socket receptacle. Dislodge the socket and screws.
4. Repeat step 3 for each of the five sockets.

Installing New Sockets

1. With the lever away from you and to the left, hold a socket directly over the socket receptacle, matching pin 1 (the lower left pin) with the pin 1 position of the receptacle.
2. Lower the socket straight down into position until the connector engages.
3. Press the socket firmly in place.
4. Install the rest of the new sockets in the same way.

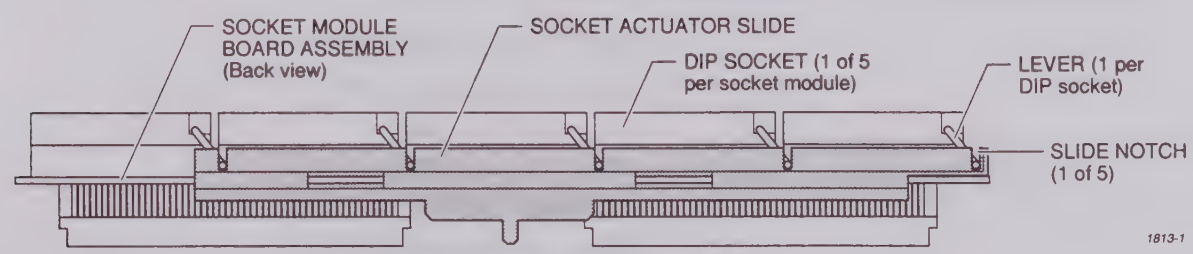
Reassembly

1. Use the needle-nose pliers to pick up and replace a small, Phillips-head screw into one of the holes at one end of socket 1. Replace all the screws at both ends of each socket (2 per socket).

CAUTION: For the following step, tighten the screws to a maximum of 0.3 in./lb torque (finger-tight). Exceeding this value may cause the socket to bow slightly, creating intermittent contact between the socket and the devices.

2. Tighten each screw with the screwdriver.
3. Replace the socket actuator slide on the upper edge of the socket module board assembly (see Figure D-2).

Figure D-2
DIP48 Socket Module Reassembly


SOCKET MODULE BOARD ASSEMBLY (Back view)
SOCKET ACTUATOR SLIDE
DIP SOCKET (1 of 5 per socket module)
LEVER (1 per DIP socket)
SLIDE NOTCH (1 of 5)
1813-1

4. Move the actuator all the way to the right (when the actuator is on the edge farthest from you).
5. Set the top cover upside-down on the antistatic workstation with the LED overlays toward you. Turn the socket module board assembly over, and place it in the top cover with the actuator away from you.
6. Replace the bottom cover.
7. Using a Phillips screwdriver, replace the eight screws securing the bottom cover to the top cover.
8. Starting in the upper left of the upper rail, insert the socket module into the upper left slot by lowering it straight down into position until the connector engages.
9. With the palms of both hands and using equal and constant pressure, press the socket module firmly in place. When the connector is fully engaged, the bottom of the socket module rests flat against the Memory rail chassis.
10. Power up the programmer.
11. Clear the socket cycles statistics as directed in the "Clear Socket Cycles" section on page 4-43.

Socket Board Replacement for PLCC, SOIC, TSOP, and QFP Socket Modules

The following kinds of socket modules are available for PLCCs, SOICs, TSOPs, and QFPs:

- Push/pop PLCC
- Push/pop SOIC
- Push/pop TSOP
- Push/pop QFP
- Hinged-top PLCC

This section describes how to replace the push/pop PLCC, SOIC, TSOP, and QFP sockets. Instructions for replacing hinged-top PLCC sockets are on page D-10.

The push/pop PLCC, SOIC, TSOP, and QFP sockets all require socket board assemblies (daughter boards) replacement when sockets need replacement.

CAUTION: The procedures in this section must be performed by a qualified electronic service technician. Do not attempt to perform these procedures if you are not qualified to do so.

WARNING: Disassembling the programmer when power is applied can cause severe electric shock.

CAUTION: Removing or installing rails or socket modules when power is applied to the programmer can damage the programmer, rails, and socket modules and voids the warranty.

Package Contents

The socket replacement kit contains the hardware to replace the sockets in your PLCC, SOIC, TSOP, or QFP socket modules. Each kit includes five socket board assemblies.

Disassembly

To replace the socket board assemblies in the PLCC, SOIC, TSOP, and QFP socket modules, you need the following tools:

- Antistatic workstation
- Antistatic wrist strap

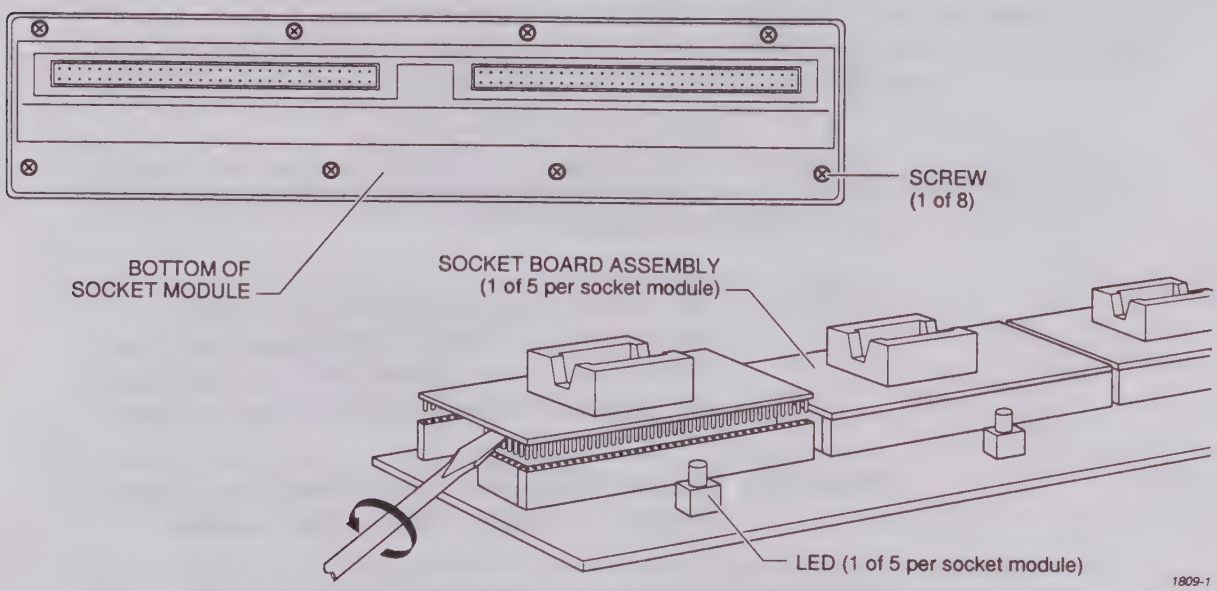
  To avoid electric shock, use an antistatic wrist strap containing a 1 MΩ (minimum) to 10 MΩ (maximum) isolating resistor.
- Phillips screwdriver
- Flat-blade screwdriver

1. Power down the programmer.
2. Place the dial in the **open** position.

Note: Socket modules cannot be removed when the dial is in the closed position.

3. Firmly grasp the socket module and pulling straight up, remove the socket module from the Memory rail.
4. Turn the socket module over on the antistatic workstation so the sockets and LEDs are down and the LEDs are toward you.
5. Using a Phillips screwdriver, remove the eight screws securing the bottom cover to the top cover (see Figure D-3).

Figure D-3
PLCC, SOIC or TSOP Socket Module Disassembly



6. Remove the bottom cover.
7. Remove the socket module board assembly from the top cover. Set the top cover aside.

Removing Old Socket Board Assemblies

1. Set the socket module board assembly on the antistatic workstation with the LEDs toward you.

Note: You will be removing and replacing the five socket board assemblies attached to the socket module board assembly.

2. Using the flat-blade screwdriver and working alternately at several points around a socket board assembly, gently separate the socket board assembly from the socket receptacle (see Figure D-3).
3. Repeat step 2 for each of the five socket board assemblies.

Installing New Socket Board Assemblies

1. Hold a socket board assembly directly over the socket receptacle, aligning the pin 1 position of the receptacle with the pin 1 position of the socket board assembly.
2. Lower the socket board assembly straight down into position until the connector engages.
3. Press the socket board assembly firmly in place.
4. Install the rest of the new socket board assemblies in the same way.

Reassembly

1. Set the top cover upside-down on the antistatic workstation with the LED overlays toward you. Place the socket module board assembly in the top cover with the LEDs down and toward you.
2. Replace the bottom cover.
3. Using a Phillips screwdriver, replace the eight screws securing the bottom cover to the top cover.
4. Starting in the upper left of the upper rail, insert the socket module into the upper left slot by lowering it straight down into position until the connector engages.
5. With the palms of both hands and using equal and constant pressure, press the socket module firmly in place. When the connector is fully engaged, the bottom of the socket module rests flat against the Memory rail chassis.
6. Power up the programmer.
7. Clear the socket cycles statistics as directed in the "Clear Socket Cycles" section on page 4-43.

Socket Replacement for PLCC Hinged-top Socket Modules

This section describes how to replace sockets in your PLCC hinged-top (HT) socket module.

CAUTION: ***The procedures in this section must be performed by a qualified electronic service technician. Do not attempt to perform these procedures if you are not qualified to do so.***

WARNING: Disassembling the programmer when power is applied can cause severe electric shock.

CAUTION: ***Removing or installing rails or socket modules when power is applied to the programmer can damage the programmer, rails, and socket modules and voids the warranty.***

Package Contents

The socket replacement kit contains the hardware to replace the sockets in your PLCC socket modules. Each kit includes five sockets.

Disassembly

To replace the sockets in a PLCC hinged-top socket module, you need the following tools:

- Antistatic workstation
- Antistatic wrist strap

  To avoid electric shock, use an antistatic wrist strap containing a 1 MΩ (minimum) to 10 MΩ (maximum) isolating resistor.
- Phillips screwdriver
- Flat-blade screwdriver

1. Power down the programmer.
2. Place the dial in the **open** position.

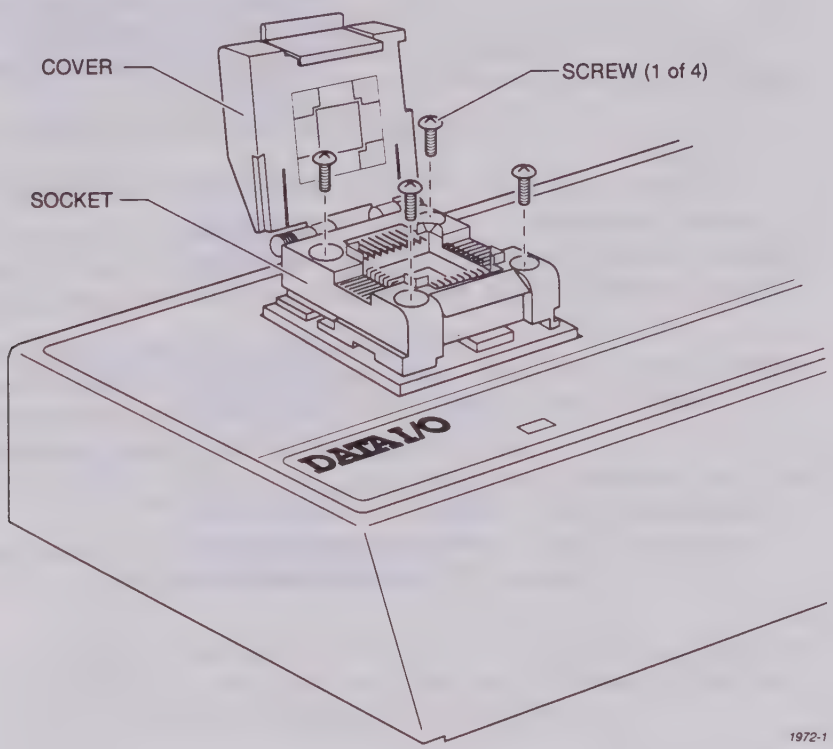
Note: Socket modules cannot be removed when the dial is in the closed position.

3. Firmly grasp the socket module and pulling straight up, remove the socket module from the Memory rail.
4. Set the socket module on the antistatic workstation right side up with the LEDs toward you.

Removing Old Sockets

1. Open a hinged-top socket. Using a Phillips screwdriver, remove the four screws securing the socket to the socket receptacle (see Figure D-4).

Figure D-4
PLCC Hinged-top Socket Removal



2. Grasp the socket and pull straight up to remove the socket. If necessary, use the flat-blade screwdriver to gently separate the socket from the socket receptacle.
3. Repeat steps 1 and 2 for each of the five sockets.

Installing New Sockets

1. Hold a new hinged-top socket directly over the socket receptacle, aligning the pin 1 position of the receptacle with the pin 1 position of the socket.
2. Lower the socket straight down into position until the connector engages. Press the socket firmly in place.

Reassembly

1. Open a hinged-top socket. Replace the screws securing the socket to the socket receptacle.

CAUTION: For the following step, tighten the screws to a maximum of 0.3 in./lb torque (finger-tight). Exceeding this value may cause the socket to bow slightly, creating intermittent contact between the socket and the devices.

2. Using a Phillips screwdriver, tighten each screw.
3. Install the rest of the new sockets in the same way.
4. Starting in the upper left of the upper rail, insert the socket module into the upper left slot by lowering it straight down into position until the connector engages.
5. With the palms of both hands and using equal and constant pressure, press the socket module firmly in place. When the connector is fully engaged, the bottom of the socket module rests flat against the Memory rail chassis.
6. Power up the programmer.
7. Clear the socket cycles statistics as directed in the "Clear Socket Cycles" section on page 4-43.

Socket Board Replacement for 68MEMCARD Socket Modules

68MEMCARD socket modules require a socket board replacement when sockets need replacement. This section describes how to replace the socket board assemblies (daughter boards) in a 68MEMCARD socket module.

CAUTION: ***The procedures in this section must be performed by a qualified electronic service technician. Do not attempt to perform these procedures if you are not qualified to do so.***

WARNING: Disassembling the programmer when power is applied can cause severe electric shock.

CAUTION: ***Removing or installing rails or socket modules when power is applied to the programmer can damage the programmer, rails, and socket modules and voids the warranty.***

Package Contents

The socket replacement kit contains the hardware to replace the PCMCIA card sockets in your 68MEMCARD socket modules. Each kit includes five socket board assemblies.

Disassembly

To replace the socket board assemblies in the 68MEMCARD socket modules, you need the following tools:

- Antistatic workstation
- Antistatic wrist strap

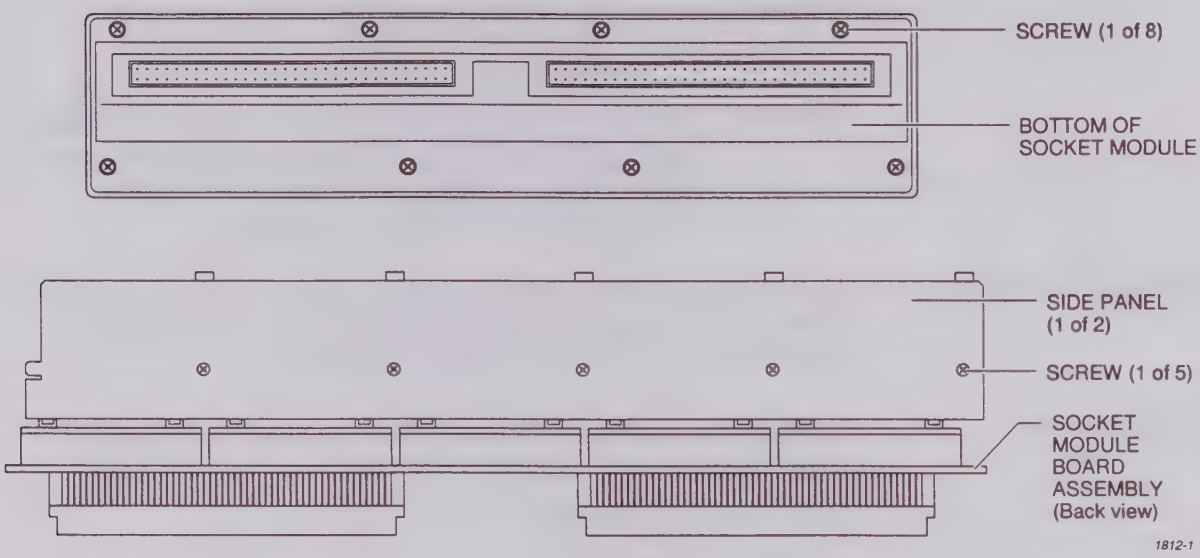
  To avoid electric shock, use an antistatic wrist strap containing a 1 MΩ (minimum) to 10 MΩ (maximum) isolating resistor.
- Phillips screwdrivers
- Flat-blade screwdriver

1. Power down the programmer.
2. Place the dial in the **open** position.

Note: Socket modules cannot be removed when the dial is in the closed position.

3. Firmly grasp the socket module and pulling straight up, remove the socket module from the Memory rail.
4. Turn the socket module over on the antistatic workstation so the sockets and LEDs are down and the LEDs are toward you.
5. Using a Phillips screwdriver, remove the eight screws securing the bottom cover to the top cover (see Figure D-5).

Figure D-5
68MEMCARD Socket Module Disassembly



6. Remove the bottom cover.
7. Remove the socket module board assembly from the top cover. Set the top cover aside.
8. Using a Phillips screwdriver, remove the screws connecting the side panels of the card sockets (see Figure D-5). Set the side panels aside.

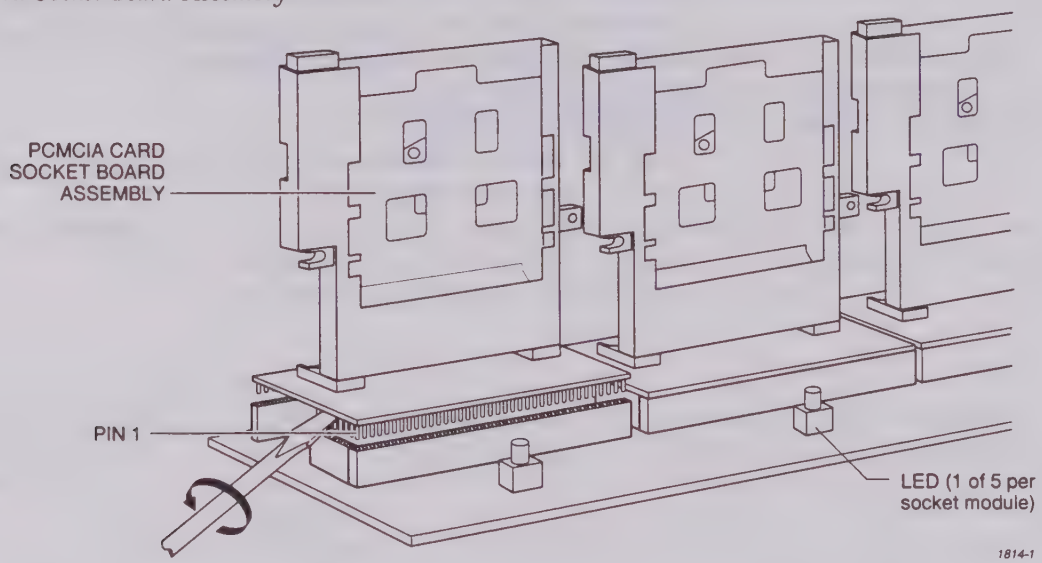
Removing Old Socket Board Assemblies

1. Set the socket module board assembly on the antistatic workstation.

Note: There are five PCMCIA card socket board assemblies (daughter boards) attached to the socket module board assembly. You will be removing and replacing the five socket board assemblies.

2. Using the flat-blade screwdriver and working alternately at several points around a socket board assembly, gently separate the socket board assembly from the socket receptacle (see Figure D-6).
3. Repeat step 2 for each of the five socket board assemblies.

Figure D-6
PCMCIA Card Socket Board Assembly



Installing New Socket Board Assemblies

1. Hold a socket board assembly directly over the socket receptacle, aligning the pin 1 position of the receptacle with the pin 1 position of the PCMCIA card socket board assembly.
2. Lower the socket board assembly straight down into position until the connector engages.
3. Press the socket board assembly firmly in place.
4. Install the rest of the new PCMCIA card socket board assemblies in the same way.

Reassembly

1. Replace the side panels. Using a Phillips screwdriver, reinstall the screws connecting the side panels of the card sockets.
2. Set the top cover upside-down on the antistatic workstation with the LED overlays toward you. Place the socket module board assembly in the top cover with the LEDs down and toward you.
3. Replace the bottom cover.
4. Using a Phillips screwdriver, replace the eight screws securing the bottom cover to the top cover.
5. Starting in the upper left of the upper rail, insert the socket module into the upper left slot by lowering it straight down into position until the connector engages.
6. With the palms of both hands and using equal and constant pressure, press the socket module firmly in place. When the connector is fully engaged, the bottom of the socket module rests flat against the Memory rail chassis.
7. Power up the programmer.
8. Clear the socket cycles statistics as directed in the "Clear Socket Cycles" section on page 4-43.

Socket Replacement for Micro, 40-pin, and 28-pin Rails

This section describes how to replace sockets on the Micro, 40-pin, and 28-pin rails.

CAUTION: ***The procedures in this section must be performed by a qualified electronic service technician. Do not attempt to perform these procedures if you are not qualified to do so.***

WARNING: Disassembling the programmer when power is applied can cause severe electric shock.

CAUTION: ***Removing or installing rails or sockets when power is applied to the programmer can damage the programmer and rails and voids the warranty.***

Package Contents

The socket replacement kit contains the hardware to replace the sockets on your Micro, 40-pin, or 28-pin rail. The parts included in the replacement kits are listed in Table D-3.

Table D-3
Contents of Socket Replacement Kits for Micro, 40-pin and 28-pin Rails

Name of Kit	Number of Rail Sockets	Number of 0-80 x 3/8" Screws	Number of Rail Tools
Micro and 40-pin rail	10	22	5
28-pin rail	15	32	5

Removing Old Sockets

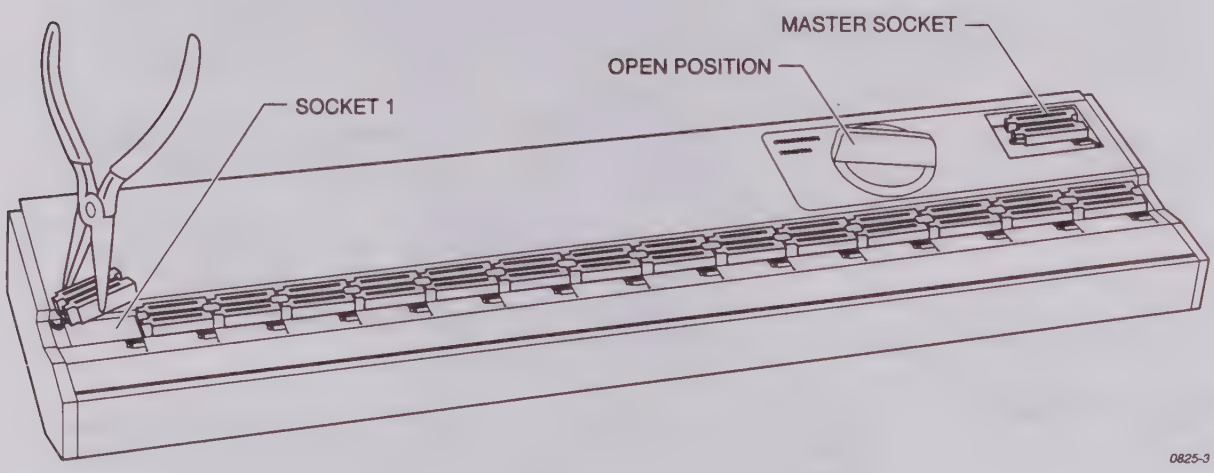
To remove a socket from a rail, you need the following tools:

- Antistatic workstation
- Antistatic wrist strap

  To avoid electric shock, use an antistatic wrist strap containing a 1 MΩ (minimum) to 10 MΩ (maximum) isolating resistor. An antistatic wrist strap receptacle is located at the right end of each rail.
- Phillips screwdriver
- Needle-nose pliers

1. Power down the programmer.
2. Remove the rail from the control module (see "Disassembling the PSX" on page 7-3).
3. Place the rail on the antistatic workstation so the sockets and LEDs are toward you.
4. Place the dial in the open position as shown in Figure D-7.

Figure D-7
Socket Rail Dial Open



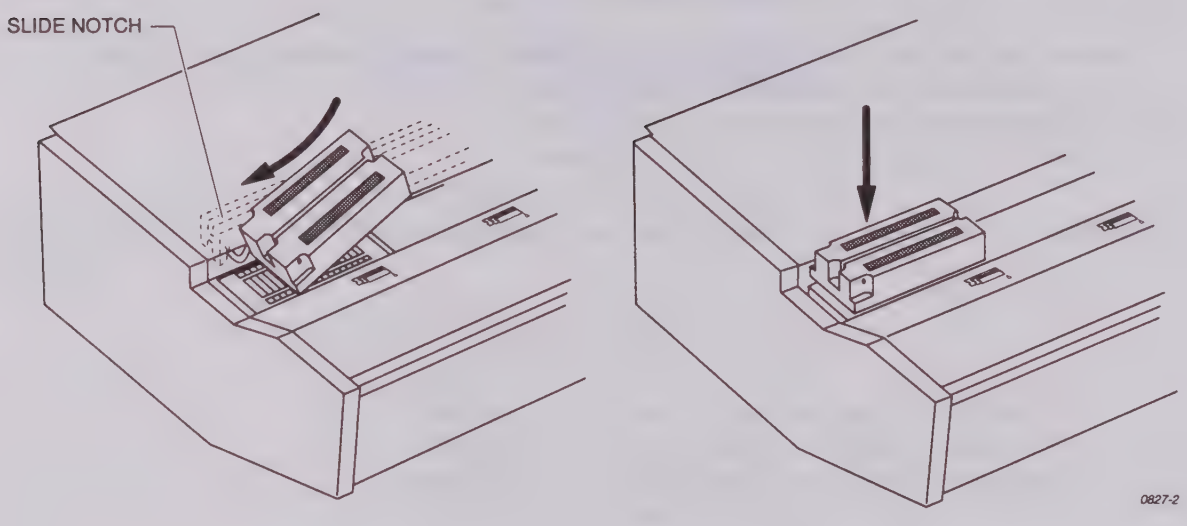
CAUTION: ***For the following step, make sure you use a Phillips screwdriver that fits the screw head. Using a screwdriver that is too large could strip the screw head.***

5. Starting with socket 1 (see Figure D-7), completely loosen the screws at each end of the socket with firm downward pressure on the screwdriver. It is not necessary to remove the screws; they will lift out when you lift the socket out. Loosen the screws on all the sockets.
6. Using the needle-nose pliers, grasp socket 1 on either side. Lifting up as you use a back and forth motion, dislodge the socket and screws. Move the socket to the right, tilt and lift the lever away from the unit. Repeat with the other sockets.

Installing New Sockets

1. Make sure the dial is in the open position as shown in Figure D-7.
2. With the lever away from you and in the closed (out) position, use the needle-nose pliers to hold a socket directly over and to the right of the pin 1 position of the socket 1 receptacle.
3. Insert the lever in the groove between the socket and the socket module or rail case and move the socket to the left until the lever fits into the slide notch (see Figure D-8).

Figure D-8
Inserting the Socket



4. Once the lever is in the slide notch, move the socket to the left, making sure the socket is raised enough over the socket receptacle that the socket pins are not damaged as you move the socket.
5. As you move the socket to the left, match pin 1 with pin 1 of the receptacle, then press the socket firmly into place.
6. Test to make sure the socket is inserted properly by carefully turning the dial. (The socket should open and close smoothly. If the socket does not actuate properly, the lever has been inserted into the wrong slot in the socket module or rail case. Remove the socket and repeat the insertion procedure until the socket opens and closes smoothly.)
7. Repeat the procedure with the remaining sockets.

Note: Once the sockets are in place, the dial should actuate all sockets (except the master socket) simultaneously.

8. Use the needle-nose pliers to pick up a flat-head screw and place it into one of the screw holes in socket 1. Replace all the screws at the ends of each socket.

CAUTION: ***For the following step, tighten the screws to a maximum of 0.3 in./lb torque (finger-tight). Exceeding this value may cause the socket to bow slightly, creating intermittent contact between the socket and the devices.***

9. Tighten each screw with the screwdriver.
10. Install the rail on the control module (see the "Installing Rail(s)" section on page 2-2).
11. Power up the programmer.
12. Clear the socket cycles statistics as directed in the "Clear Socket Cycles" section on page 4-41.

Master Socket Replacement

This section describes how to replace the master socket on the PSX rails.

CAUTION: The procedures in this section must be performed by a qualified electronic service technician. Do not attempt to perform these procedures if you are not qualified to do so.

WARNING: Disassembling the programmer when power is applied can cause severe electric shock.

CAUTION: Removing or installing rails or sockets when power is applied to the programmer can damage the programmer and rails and voids the warranty.

Removing Old Socket

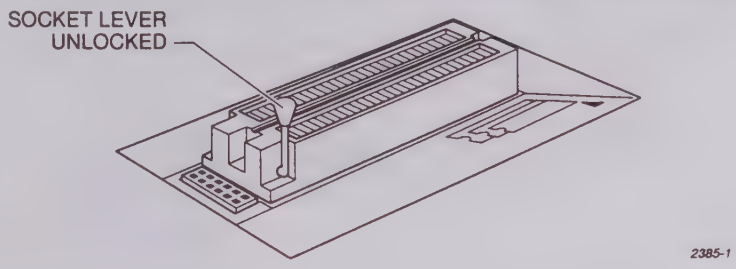
To remove the master socket from a rail, you need the following tools:

- Antistatic workstation
- Antistatic wrist strap

  To avoid electric shock, use an antistatic wrist strap containing a 1 MΩ (minimum) to 10 MΩ (maximum) isolating resistor. An antistatic wrist strap receptacle is located at the right end of each rail.
- Phillips screwdriver
- Needle-nose pliers

1. Power down the programmer.
2. Remove the rail from the control module (see "Disassembling the PSX" on page 7-3).
3. Place the rail on the antistatic workstation so the sockets and LEDs are toward you.
4. On the master socket, make sure the lever is in the open or up position (see Figure D-9).

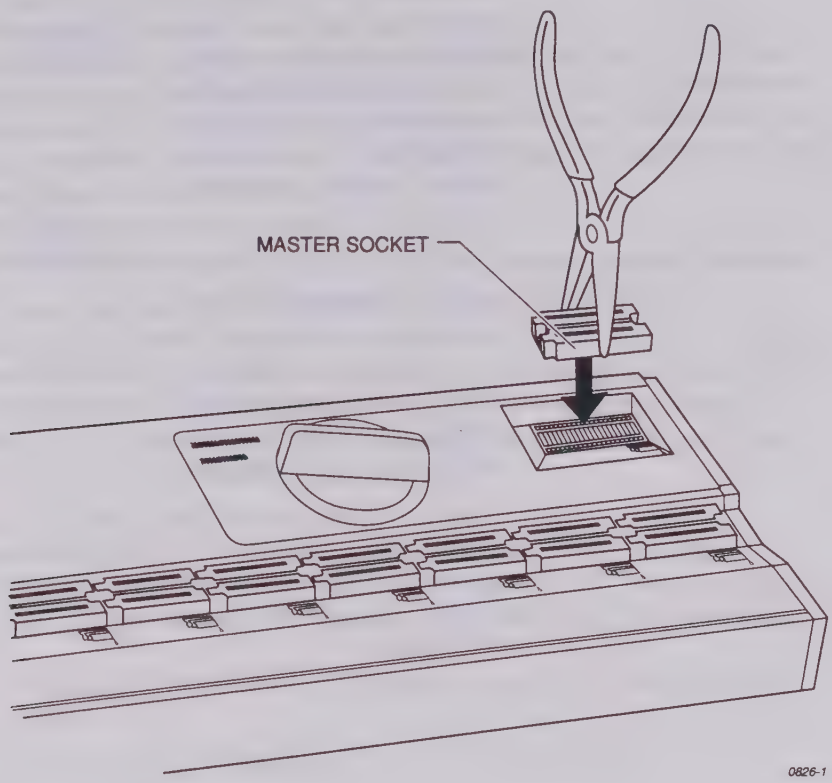
Figure D-9
Master Socket Lever in Open Position



CAUTION: ***For the following step, make sure you use a Phillips screwdriver that fits the screw head. Using a screwdriver that is too large could strip the screw head.***

5. Completely loosen the screws at each end of the master socket with firm downward pressure on the screwdriver. It is not necessary to remove the screws; they will lift out when you lift the socket out.
6. Using the needle-nose pliers, grasp the master socket on either side. Lifting up as you use a back and forth motion, dislodge the socket and screws (see Figure D-10).

Figure D-10
Master Socket



Installing New Socket

1. On the master socket, make sure the lever is in the open or up position.
2. Match pin 1 of the master socket with pin 1 of the receptacle, then press the master socket firmly into place.
3. Use the needle-nose pliers to pick up a flat-head screw and place it into one of the screw holes in the master socket. Do the same for the other screw.

CAUTION: ***For the following step, tighten the screws to a maximum of 0.3 in./lb torque (finger-tight). Exceeding this value may cause the socket to bow slightly, creating intermittent contact between the socket and the devices.***

4. Tighten each screw with the screwdriver.
5. Install the rail on the control module (see the "Installing Rail(s)" section on page 2-2).
6. Power up the programmer.

Calibrating the PSX

To ensure correct programming voltages and maximum programming yields, Data I/O recommends that you turn your PSX off and then on again at least once every three months to run the system self-test and automatic calibration routines. If the software cannot compensate for present voltage variations, the PSX displays any of several calibration-related messages. You should calibrate the PSX power supply any time the PSX displays a calibration or power supply message. Calibration procedures are described on the following pages.

The PSX verifies internal voltages every time it is powered up, every time a complete self-test is run, and every time a device operation is run. The voltage verification is performed by software and is compared to a laser-trimmed voltage reference. Contact Data I/O for information on checking the reference voltage and the master clock.

To ensure that your the PSX continues to meet product performance specifications, Data I/O recommends that your programmer be returned to an authorized Data I/O Service Center every twelve months for a complete performance evaluation.

Disassembly

WARNING: Dangerously high voltages are present. The procedures in this section must be performed by a qualified electronic service technician. Do not attempt to perform these procedures unless you are qualified to do so.

WARNING: Disassembling the programmer when power is applied can cause severe electric shock.

CAUTION: Assembling or disassembling the programmer when power is applied can damage the programmer, rails, and socket modules, and voids the warranty.

CAUTION: When calibrating the PSX power supply, complete the entire procedure. Do not attempt to perform selected sections of the procedure.

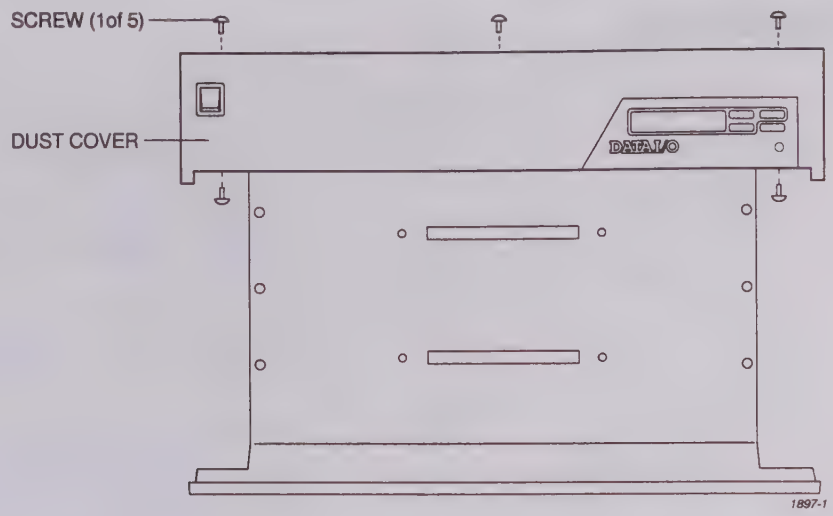
To calibrate your PSX power supply, you need the following tools:

- Antistatic workstation
- Antistatic wrist strap

  To avoid electric shock, use an antistatic wrist strap containing a 1 MΩ (minimum) to 10 MΩ (maximum) isolating resistor.
- A 3.5-digit Digital Multimeter (DMM) with an accuracy of ±0.25%V dc (for example, a Fluke 8050A DMM)
- Insulating material such as an antistatic bag or rubber mat
- Phillips screwdrivers
- Potentiometer tweaker or very small flat-blade screwdriver
- Hook tool or needle-nose pliers

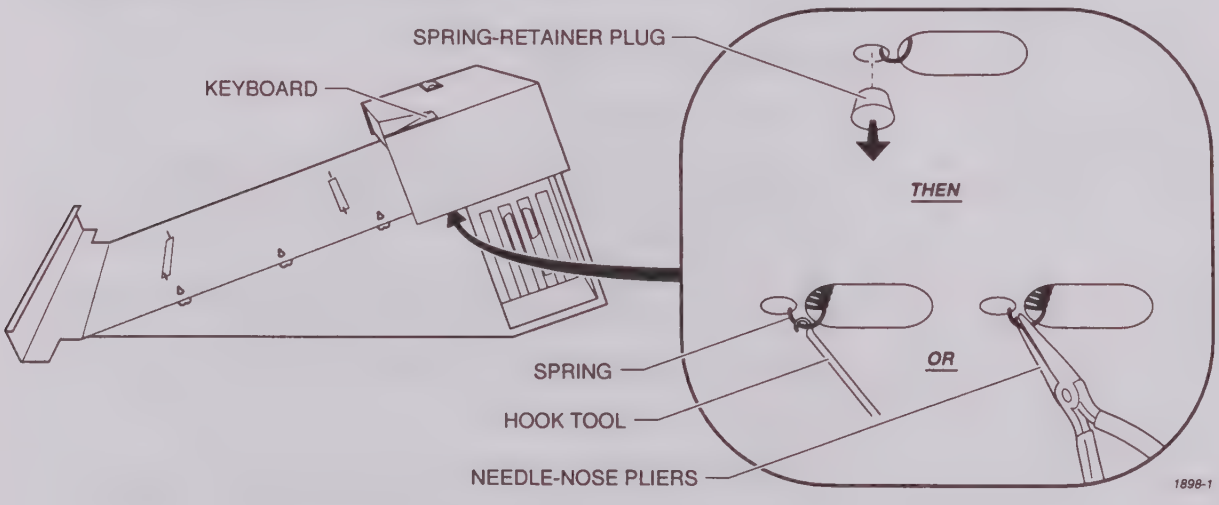
1. Power down the programmer and disconnect the power cord and any shielded I/O port cables from the programmer.
2. Remove any installed rails (see "Disassembling the PSX" on page 7-3). You do not need to remove socket modules from a Memory rail before removing it from the control module.
3. Remove the five screws from the dust cover (see Figure D-11). Retain the screws for replacement of the dust cover.

Figure D-11
Location of Screws on PSX Dust Cover



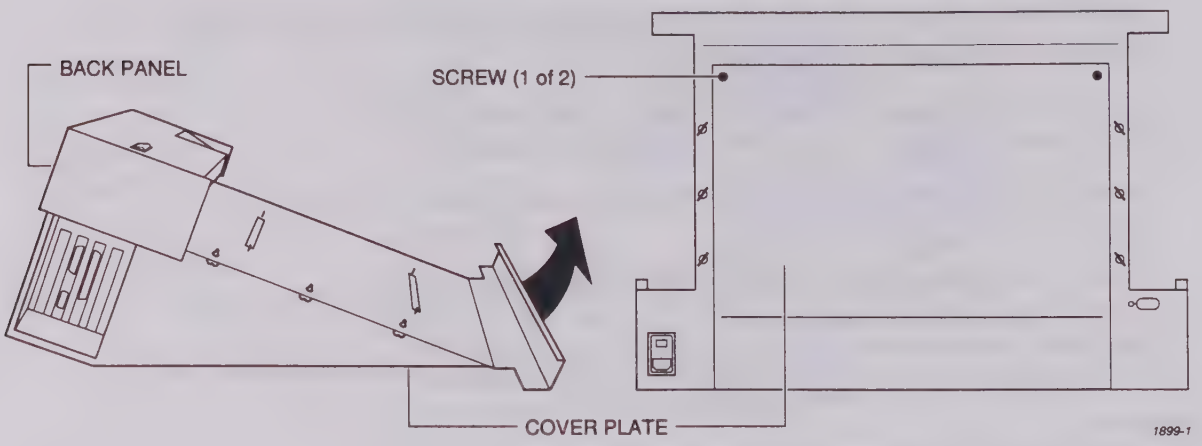
4. Underneath the keyboard, remove the spring-retainer plug. Using the hook tool or needle-nose pliers, unhook the spring (see Figure D-12).

Figure D-12
PSX Keyboard and Dust Cover Removal



5. Lift the keyboard out of the dust cover. Put the keyboard through the keyboard opening and place on the programmer chassis.
6. Remove the dust cover.
7. To ensure that the keyboard doesn't short, place it on an insulating material such as an antistatic bag or rubber mat.
8. Place the programmer upright on its back panel with the bottom cover plate toward you (see Figure D-13).

Figure D-13
PSX Bottom Cover Plate Removal



9. With the Phillips screwdriver, remove the two screws securing the bottom cover plate to the frame. Retain the screws for replacement of the bottom cover plate.
10. Lift the bottom cover plate clear of the programmer and set it aside.
11. Reconnect the power cord (see the "Connecting the Power Cord" section on page 2-7).
12. Power up the programmer (see the "Turn on the Power" section on page 2-9).

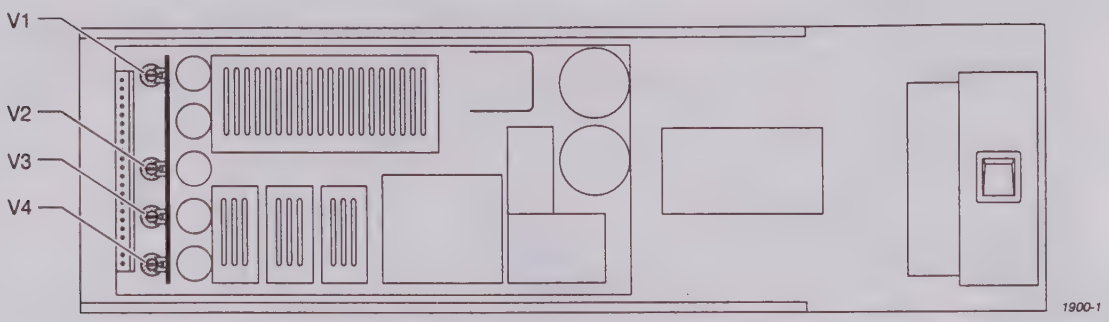
    Wait at least 30 minutes before continuing the calibration procedure. This allows the power supply to stabilize and helps ensure accurate results.

Calibration Procedure

The power supply in your PSX programmer is one of three kinds. Examine the power supply installed in your programmer to determine which of the following power supplies your programmer uses. The adjustment location for each test point depends upon the power supply installed.

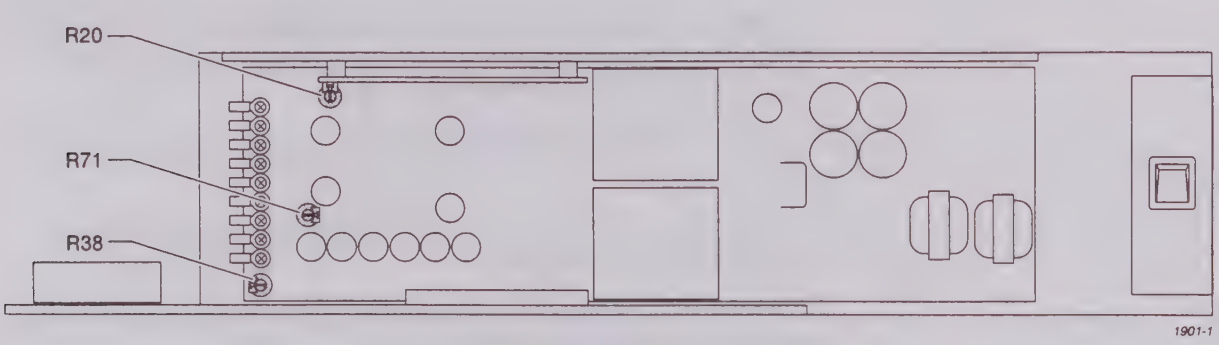
The PSI™ power supply (part number 806-0165) is shown in Figure D-14.

Figure D-14
PSI Power Supply Potentiometer Locations



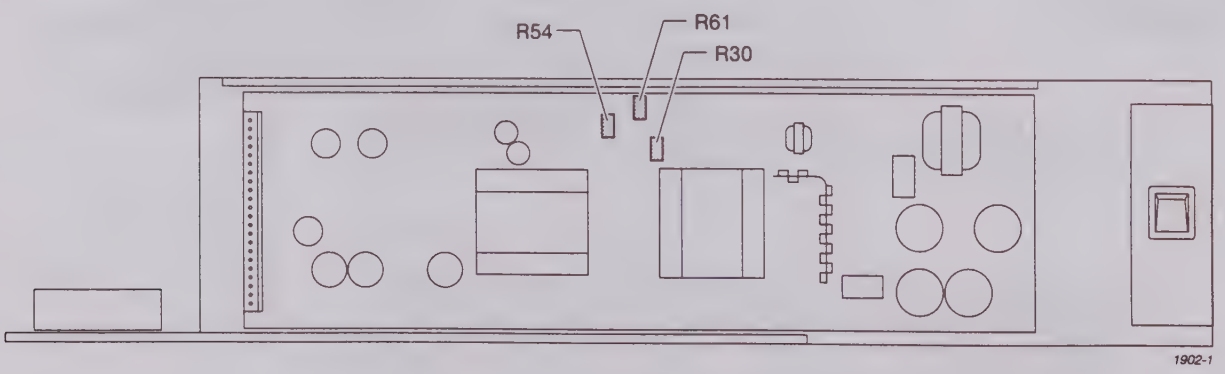
The Power One™ power supply (part number 806-0150) is shown in Figure D-15.

Figure D-15
Power One Power Supply Potentiometer Locations



The Boschert™ power supply (part number 806-0150) is shown in Figure D-16.

Figure D-16
Boschert Power Supply Potentiometer Locations



WARNING: When performing the following steps, avoid electric shock by observing extreme caution while adjusting the voltage. Dangerously high voltages are present at several locations inside the power supply, including some heatsinks. Do not touch heatsinks or exposed circuitry.

1. For each voltage listed in Table D-4, connect the DMM test leads between **TP1 (ground)** and the test point listed.

   All test points are shown on the CPU board (701-2408) in Figure D-17.

2. Using the potentiometer tweaker or very small flat-blade screwdriver, adjust the potentiometer specified in Table D-4 (see Figure D-14, D-15, or D-16 for potentiometer locations) until the voltage reading on the DMM is at the **nominal** voltage level for that test point.

3. Use the test points that are not adjustable to verify that the voltage is at or near the **nominal** voltage level for that test point.

4. If any of the non-adjustable test points are not at or near the **nominal** voltage level for that test point, repeat the calibration procedure. If the non-adjustable readings are still out of tolerance, replace the power supply (part numbers for the power supplies are listed on page D-27).

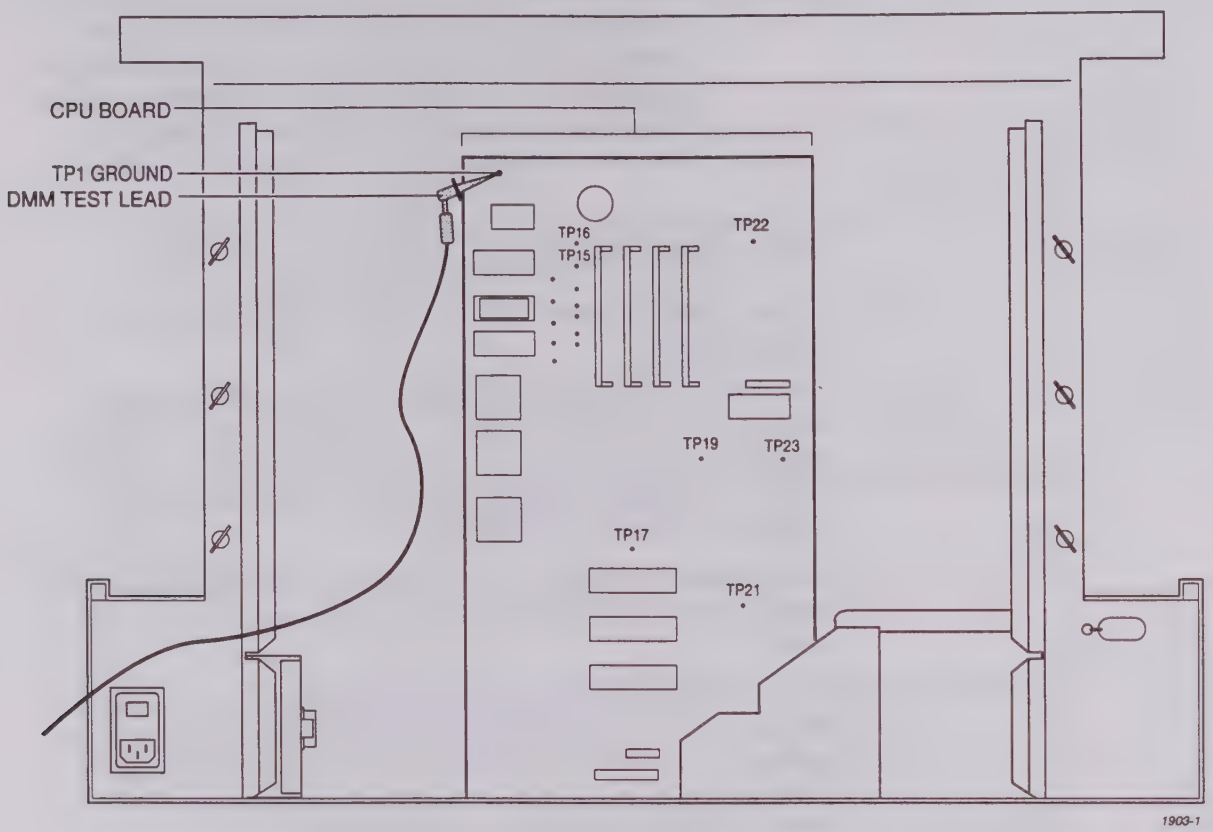
Table D-4
PSX Calibration Voltages

					Potentiometer Location		
Voltage *	**Test Point**	**Min. ***	**Nom. ***	**Max. ***	*PSI*	*Power One*	*Boschert*
+32.0	TP23	+31.500	+32.070	+32.640	V4	R71	R61
+12.0	TP17	+12.120	+12.250	+12.370	V1	R20	R54
+5.0	TP22	+5.075	+5.100	+5.125	V2	R38	R30
-12.0	TP19	-12.600	-12.300	-12.000	V3	–	–
-12.0	TP19	-12.360	-12.000	-11.640	–	†	†
-5.0	TP15	-5.250	-5.000	-4.750	†	†	†
-3.6	TP16	-4.100	-3.600	-3.100	†	†	†
+10.0 (REF)	TP21	+9.900	+10.000	+10.100	†	†	†

* *All voltages are in V dc.*

† *These test points are for verification purposes only – they are not adjustable.*

Figure D-17
Calibration Test Points on PSX CPU Board



5. Remove the DMM test leads.
6. To run the self-test on the CPU board, power down the programmer, then power it up again. The programmer displays

```
CPU OKAY
```

7. Power down the programmer for reassembly.

CAUTION: ***Assembling or disassembling the programmer when power is applied can damage the programmer, rails, and socket modules, and voids the warranty.***

Reassembly

Reassemble the PSX as follows:

1. Replace the bottom cover plate in its original position.
2. Reinstall the two Phillips-head screws securing the bottom cover plate to the chassis.
3. Place the programmer in normal operating position, placing the keyboard on the programmer chassis.
4. Replace the dust cover, putting the keyboard through the keyboard opening and placing it on the dust cover.
5. Center the dust cover over the power switch and reposition the keyboard.
6. Lift the right side of the programmer up and use the hook tool or needle-nose pliers to grasp the lower end of the keyboard spring through the oval opening on the chassis.

   Replace the hook on the end of the spring in the nearby circular opening.
7. Secure the hook with the spring-retainer plug.
8. Replace the five screws securing the dust cover to the programmer chassis.
9. Return the programmer to its upright position and reconnect any shielded I/O port cables (see the "Connecting I/O Port Cables" section on page 2-8).

CAUTION: Installing rails when power is applied to the programmer can damage the programmer, rails, and socket modules and voids the warranty.

10. Reinstall the rail(s) as directed in the "Installing Rail(s)" section on page 2-2.
11. Power up the programmer (see the "Turn on the Power" section on page 2-9).

Index

A

Active port, 4-31
Address Offset, 4-24
Alternate rail mode, 4-27
Alternate rail programming
  described, 4-29
  and Copy From Master, 4-4
  and Copy From RAM, 4-6
  and Load From Set, 4-13
  and Verify From Master, 4-45
  and Verify From RAM, 4-47
  and Verify From Set, 4-48
  Auto Device Select not supported with, 4-29
Application Notes, 4-54
Attribute memory, 4-21
Auto Device Select, 3-14

B

Battery, 7-6
  disposing of, 7-7
  replacing, 7-6
Baud rates
  parallel and serial, C-2
  setting, 4-31
BBS, A-4
Beeper pitch setting, 4-26
Bitsize, setting, 4-27
Block Limit, setting, 4-34
Bulletin Board Service, A-4

C

Cables, 2-8
Calibration, D-24
Canadian Standard Association, C-3
Checksum
  described, 3-17
  calculation mode, setting, 4-20
  calculation, enable/disable, 4-20
  display width, setting, 4-20
  view master, 4-52
Cleaning the PSX, 7-4
Clear RAM, 4-35
Clear Socket Cycles
  control module, 4-41
  socket module, 4-43
Clear Statistics
  control module, 4-40
  socket module, 4-43
Command summary, 4-1, 4-2
Commands
  See Also specific command names
  Copy From Master, 4-4
  Copy From RAM, 4-6
  Copy From Set, 4-8
  Diagnostics, 4-10
  Load From Master, 4-12, 4-13
  Load Thru Port, 4-15
  Remote Control, 4-16
  Send Thru Port, 4-17
  Set Device Options, 4-18
  Set I/O Options, 4-23
  Set Operation Options, 4-26
  Set Port Options, 4-31
  Set RAM Options, 4-33
  Set Verify Options, 4-38
  Set VP Options, 4-37
  Statistics, 4-40
  Verify From Master, 4-45
  Verify From RAM, 4-47
  Verify From Set, 4-48
  Verify Thru Port, 4-50
  View Configuration, 4-51
  View Master Checksum, 4-52
  View Master ID, 4-53
Computer remote control
  enable/disable code, 4-16
  message codes for, 6-3
  saved as default, 3-18
Configuration
  available components, x
  installing rails, 2-2
  installing socket modules, 2-6, 2-10
  supported arrangements of socket modules, 2-6
  viewing, 2-10, 4-51
Control modules, available, x
Copy From Master, described, 4-4
Copy From RAM, described, 4-6

Copy From Set, described, 4-8
Customer Support, A-1, A-2
Customized online device list, 3-1, 4-21

D
Data I/O
addresses, A-1, A-2
Bulletin Board Service, A-4
contacting via BBS, A-4
contacting via electronic mail, A-3
contacting via phone, A-3
Data Lock
and Clear RAM, 4-35
and Clear Statistics, 4-40
and Diagnostics, 4-10, 4-11
and Invert RAM, 4-35
and Load From Set, 4-12, 4-13
and Load Thru Port, 4-15
and Select Bitsize, 4-27
and Select Setsize, 4-27
and Set Beginning RAM Address, 4-34
and Set Block Limit, 4-34
and Set Word Order, 4-36
setting, 4-33
Data transfer
See Also RAM
checksum, 3-17
enabling hardware translators, 4-32
loading RAM from host, 4-15
sending RAM through port, 4-17
verifying RAM against host, 4-50
Defaults, C-4
power down, 3-18
resetting, 4-30
saving parameters as, 3-18
verify voltage levels, 4-45
Device Insertion Test, 4-19
Device list online, 3-1
customized, 3-1, 4-21
Device options
See Set Device Options
Device support, xii, 3-1
Devices
attribute memory, 4-21
Auto Device Select, 3-14
customized online device list, 3-1, 4-21
DIP, installing and removing, 3-5
memory card, installing and removing, 3-11
PLCC hinged-top, installing and removing, 3-8
PLCC push/pop, installing and removing, 3-7
QFP, installing and removing, 3-9
selecting, 3-14
set programming and, 4-8
SOIC, installing and removing, 3-9
TSOP, installing and removing, 3-9
verifying, 4-45
verifying set, 4-48
Diagnostics, described, 5-3
Disassembly, 7-3
Display adjustment button, 1-2, 2-9, 5-2
Disposal of lithium battery, 7-8

E
Electromagnetic interference (EMI) certification, C-3
Electronic ID, 3-15
automatic device selection, 3-14
setting, 4-18
Electrostatic discharge (ESD)
rate of, C-3
reducing, 7-2
Environmental Protection Agency (EPA), 7-8
Error messages, 3-18, 6-3
Error Options, setting, 4-28
Excessive Socket Cycles, clearing, 4-41, 4-43, 7-16

F
Federal Communications Commission (FCC), C-3, C-5
Firmware update, 7-12
Fuse, 7-9

H
Handshaking, 4-25
Hardware translators, 4-32
Hazardous waste, disposing of, 7-7

I
I/O cables, 5-2
I/O Format, 4-23

I/O options
See Set I/O Options
IEEE
baud rates supported with, C-3
installation, B-1
See Also TaskLink IEEE (980-0050-003)
IEEE-488
connecting, 2-8
enabling hardware translators, 4-32
Install device in master socket, 3-3
Installation, IEEE, B-1
Installing
battery, 7-6
devices, 3-4
firmware update, 7-12
power cord, 2-7
rails, 2-2
RAM upgrade, 7-12
socket modules, 2-10
International Electrotechnical Commission, C-3
Invert RAM, 4-35

K

Keep Current Subscription Service, A-5

L

LED color for empty socket, setting, 4-30
LED status indicators, 3-17
Lights, 3-17
Line fuse
See Fuse
Lithium battery, disposal of, 7-8
Load From Master, described, 4-12, 4-13
Load From Set, described, 4-13, 4-14
Load Thru Port, described, 4-15
Lockbits, setting, 4-22

M

Maintenance
See Also Socket replacement
See Also Troubleshooting
battery, replacing and disposing of, 7-6
calibration, D-24
cleaning the PSX, 7-4
electrostatic discharge (ESD), reducing, 7-2
firmware update, installing, 7-12
fuse, replacing, 7-9
RAM upgrade, installing, 7-12
sockets, replacing, D-2
Master
view checksum, 4-52
view ID, 4-53
Master socket, 3-3
Memory cards
and attribute memory, 4-21
installing and removing, 3-11
Menus
accessing, 4-1
summary of, 4-1, 4-2
Messages, 3-18
CRC codes for, 6-3
Messages (errors), 6-1
Module, installing, 2-5

O

Online device list, 3-1
Operation, 3-12
stopping, 3-16
Operation options
See Set Operation Options
Options available for PSX400, xiii

P

Parallel rail programming
described, 4-29
and Copy From Master, 4-4
and Copy From RAM, 4-6
and Load From Set, 4-13
and Verify From Master, 4-45
and Verify From RAM, 4-47
and Verify From Set, 4-48
two masters error, 6-16
Parameters
resetting system, 4-30
saving as defaults, 3-18
Parity, 4-31
Parts, 7-1, D-1
Pitch of beeper, setting, 4-26
PLCC devices, installing
hinged-top sockets, 3-8
push/pop sockets, 3-7

Port cables, 2-8
Port options
See Set Port Options
Power cord, 2-7
Powerup, 2-9
PSX
battery, replacing and disposing of, 7-6
calibration, D-24
devices, installing and removing, 3-4
DIP sockets, replacing, D-3
electrostatic discharge, reducing, 7-2
fuse, replacing, 7-9
hazardous waste, disposing of, 7-7
master socket, replacing, D-21
memory card sockets, replacing, D-13
menu, top-level, 4-2
Micro rail sockets, replacing, D-17
operation of, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-7, 3-8, 3-9, 3-10, 3-11, 3-12, 3-13, 3-14, 3-15, 3-16, 3-17, 3-18
PLCC hinged-top sockets, replacing, D-10
PLCC push/pop sockets, replacing, D-7
rails, installing, 2-2
reassembly of, 7-15, D-31
socket modules, installing, 2-10
sockets, replacement parts for, xv
sockets, warranties for, D-2
SOIC sockets, replacing, D-7
specifications, C-1
TSOP sockets, replacing, D-7
28-pin rail sockets, replacing, D-17
update, installing, 7-12
upgrade, installing RAM, 7-12
PSX1000
factory defaults, C-4
menu, top-level, 4-1
PSX400
described, x, xiii
getting to know, 1-1
operation of, 1-1
options for, xiii
service for, xiii

Q QFP, installing and removing, 3-9

R Rail Mode
described, 4-29
setting, 4-27
Rail tool, 3-6
Rails, xiv
See Also Alternate rail programming
See Also Parallel rail programming
See Also Set Operation Options, rail mode
described, xiv
installing, 2-2
RAM, 7-12
See Also Set RAM Options
address, setting beginning, 4-34
and Send Thru Port, 4-17
load from master device(s), 4-12, 4-13
loading from host, 4-15
loading from set, 4-12, 4-13
upgrade, described, xiii
upgrade, installing, 7-12
verifying against host, 4-50
Reassembly of programmer, D-31
Reassembly of PSX, 7-15
Remote control, 4-16
See Also Computer remote control
Removing
bottom cover, 7-5
devices, 3-4
Repair service, xiii, A-5
Replacement parts, xv, 7-1, D-1
Replacing
28-pin rail sockets, D-17
40-pin rail sockets, D-17
68MEMCARD sockets, D-13
DIP48 sockets, D-3
fuse, 7-9
master socket, D-21
Micro rail sockets, D-17
PLCC hinged-top sockets, D-10
PLCC push/pop sockets, D-7
QFP sockets, D-7
SOIC sockets, D-7
TSOP sockets, D-7
Replacing battery, 7-6
Resetting system parameters, 4-30
RS-232C cable, connecting, 2-8

S

Safety
- disposing of lithium battery, 7-7
- electromagnetic interference (EMI), certification, C-3
- electrostatic discharge (ESD), reducing, 7-2
- standards, C-3

Saving parameters as defaults, 3-18
Security bit, programming, 4-19
Select Device List, customized online device list, 3-1
Send Thru Port, described, 4-17
Set Device Options
- described, 4-18
- attribute memory, 4-21
- checksum calculation mode, 4-20
- checksum display width, 4-20
- checksum enable/disable, 4-20
- device test, 4-19
- electronic ID, 4-18
- lockbits, 4-22
- security bit, 4-19
- Select Device List, 4-21

Set I/O Options
- described, 4-23
- address offset, 4-24
- handshake, 4-25
- I/O format, 4-23
- timeout, 4-25

Set Operation Options
- described, 4-26
- beeper pitch, 4-26
- bitsize, 4-27
- error options, 4-28
- LED, 4-30
- rail mode, 4-29
- setsize, 4-27
- system parameters, 4-30

Set Port Options
- described, 4-31
- baud rate, 4-31
- hardware translators, 4-32
- parity, 4-31
- SmartPort, 4-32
- stop bits, 4-32

Set programming
- bitsize, 4-27
- Copy From Set, 4-8
- from RAM, 4-8
- loading RAM from set, 4-12, 4-13
- setsize, 4-27
- Verify From Set, 4-48

Set RAM Options
- described, 4-33
- beginning RAM address, 4-34
- block limit, 4-34
- clear RAM, 4-35
- data lock, 4-33
- invert RAM, 4-35
- word order, 4-36

Set Variable Parameters Options, 4-37
Set Verify Options
- described, 4-38
- defaults, 4-39
- passes, 4-38
- voltage levels, 4-39

Setsize, setting, 4-27
Setup, summary of, 3-4
SIMMs, upgrade, installing, 7-12
Set Word Order, 16-bit devices, setting, 4-36
SmartPort, 4-32
Socket modules, xi, xiv
- arrangement of, 2-6
- installing, 2-10
- needed for specific device, xii, 3-1
- versions supported on, 2-10

Socket rails
- *See Also* rails

Socket replacement
- 28-pin rail, D-17
- 68MEMCARD, D-13
- clearing excessive cycles, control modules, 4-41
- clearing excessive cycles, socket modules, 4-43
- DIP48, D-3
- instructions, D-3
- kit part numbers, D-2
- master, D-21
- Micro rail, D-17

PLCC, hinged-top, D-10
PLCC, push/pop, D-7
SOIC, D-7
TSOP, D-7
warranties for, A-4, D-2
SOIC, installing and removing, 3-9
Sound, setting pitch, 4-26
Spare parts, xv, 7-1, D-1
Specifications, xii, C-1, C-3
Statistics
described, 4-40
control module, 4-40
socket module, 4-42
Stop bits, 4-32
Stop operation, 3-16
Support, device, 3-1
Symbols, xvi
System parameters, resetting, 4-30
System test, 2-9

T

TaskLink
and translation formats, 4-32
enabling hardware translators, 4-32
setup, 2-1
Technical Assistance, A-3
Test
device insertion, 4-19
diagnostic, 5-3
powerup, 2-9
Theory of operation, 5-16
Timeout, 4-25
Translation format
See Also Hardware translators
recommended for TaskLink and IEEE, 4-32
supported formats, 4-32, 4-54
Troubleshooting
circuit block diagrams for, 5-17
diagnostics, 5-3
list of basic problems, 5-1
list of boards in PSX system, 5-16
TSOP, installing and removing, 3-9
Typographic conventions, xvi

U

Underwriters Laboratories, C-3
Update, 7-12
contracts, xiii
installing, 7-12
Keep Current Subscription Service, A-5
Upgrade, 7-12
described, xiii
installing, 7-12

V

Variable Parameters
described, xiii
setting options for, 4-37
Verband Deutscher Electrotechniker, C-3
Verify From Master, 4-45
Verify From RAM, described, 4-47
Verify From Set, described, 4-48
Verify options
See Set Verify Options
Verify Passes, setting number of, 4-38
Verify Thru Port, described, 4-50
Verify voltage levels, 4-39
Version, verifying, 2-10
View Configuration, described, 4-51
View Master Checksum, described, 4-52
View Master ID, described, 4-53
View Socket Cycles
control module, 4-41
socket module, 4-43
View Statistics
control module, 4-40
socket module, 4-42
Voltage levels, 4-39

W

Warranty, A-4
for product, A-4
for sockets, A-4, D-2

Glossary

Action Symbol — Found in the upper left-hand corner of the screen, the action symbol rotates to indicate that the programmer is performing an operation.

Address — A coded instruction designating the location of data or program segments in storage.

Address Offset — A value subtracted from addresses during input translation and then added to addresses during output translation.

Algorithm — The software file containing information to program a specific device, usually contained on a floppy disk.

All Parameters — Also referred to as the Complex Parameters screen, the All Parameters screen displays all applicable parameters on a parameter entry screen.

Approval — Indication that a device manufacturer has tested an algorithm to support a specific device on a programmer. The level of an approval varies by device manufacturer, but an approval usually indicates both yield and waveform analysis.

AutoBaud — A special feature on the programmer that senses the baud rate of equipment connected to the programmer and sets the programmer's baud rate to match the equipment's baud rate. AutoBaud is designed for equipment that cannot support baud rates as high as 9600 baud, such as 1200/2400 baud modems.

Base — The interface between the programmer and the device. The Base routes the signals between the device and the Universal Pin Drivers inside the programmer.

Baud Rate — A measure of data flow. The number of signal elements per second based on the duration of the shortest element. When each element carries one bit, the Baud rate is numerically equal to bits per second.

Blank Check	A device check that checks a device for programmed bits. If no programmed bits are found, the device is considered blank.
Block Size	The hexadecimal number of bytes to be transferred in a data transfer. The beginning of the block is defined by a begin address, and the end of the block is the sum of the block size and the begin address minus one.
Byte Swap	See Odd/Even Byte Swap.
Command Window	The left side of the screen. At the top of the window is the menu name, displayed in uppercase letters. Below the menu name, the available commands are displayed in upper- and lowercase characters.
Communications Parameters	The various settings that determine the I/O characteristics of your equipment. The parameters include baud rate, stop bits, data bits, handshaking, etc.
Compare Electronic ID	A command that compares the electronic signature of the socketed device against the electronic signature specified in the currently selected algorithm.
Compensated Vector Test	A device test that enables load compensation on PLD output pins under test during vector testing. This may eliminate structured test errors when testing PLDs sensitive to output loading, where many of the devices register transitions simultaneously.
Complex Parameter Screen	See All Parameters.
Computer Remote Control	A command set that may be used to operate a programmer remotely. These commands are usually the basis for external programmer drivers, which may operate a programmer from a PC or other host. See also Remote Mode.
Context-sensitive	Information that changes depending on the screen position. With the programmer, every time you move the cursor to a different field, the information on the online help screen changes.
Continuity Check	A device check that tests for open device pins before performing a device operation.
CRC	An acronym for Computer Remote Control. See Remote Mode.
Cross Programming	A programming operation that allows a single generic programmable logic device (PLD) to be configured as any one of many PLD architectures. Consequently, the generic device can take on the function of many subset devices. As an example, a 16V8 generic PLD can be configured as a 16R4, 16R8, 16L8, etc.
Data Bits	A communication parameter that specifies the number of bits per byte.

Data Representation — The manner in which the data in user memory appears on the screen. You can select either **X** and **-**, or **0** and **1**, where **X** and **0** represent an unprogrammed state, and **-** and **1** represent a programmed state.

Data Word Width — The word width of the data to be used during a device operation. For 8-bit (or above) devices, the maximum is 64, and the minimum word width is equal to the device width. For 4-bit devices, the word width can be 4, 8, 16, or 32. This value should match the word width of the data bus in the target system for the device being programmed.

Destination — The place to where you are sending something. The "something" you are sending to the destination is almost always data. The "where" you are sending the data can be RAM, a disk file, or one of the programmer's serial ports.

Device Begin Address — The first hexadecimal address of device data to use for a device operation. If programming, it represents the first address to program. If verifying, it represents the first address to verify.

Device Block Size — The size of device data to be used in device operations.

Device Libraries — The method of device support for the programmer. The device algorithms have been organized according to device technology and pin count.

Device Operation — Usually a term that refers to loading, programming, or verifying. However it can also refer to other available commands, such as device checks and electronic erasing.

Device Word Width — The number of bits in the data word of the device.

DIP — A type of device package. An acronym for Dual In-line Package.

Dialog Window — The largest window on the screen. The dialog window displays different information and system parameters, depending on the selected command.

Download Data — A file operation that moves a data file from a host computer to the programmer's RAM or disk.

Download Echoing — Displays the data being downloaded.

Download Host Command — A command that is sent from the programmer to the host during a download. The command tells the host to begin sending data to the programmer.

E-MICRO — An acronym for Programmable Microcontroller. A type of device technology.

EPROM — An acronym for Erasable Programmable Read-Only Memory. (Usually refers to UV erasable memories.)

EEPROM — An acronym for Electronically Erasable Programmable Read-Only Memory. The device can be either completely or partially erased electrically in circuit or on the programmer.

Electronic ID — The combination of bytes that identify the device number and manufacturer of a programmable device.

Enhanced Security Fuse Capability — Found on EMICROs, the Enhanced Security Fuse Capability allows security fuse data to be stored in a data file. For more information, or to see if a device supports this capability, see the device manufacturers data book.

ESD — An acronym for Electro-Static Discharge.

False Positive — In programming, a misprogrammed fuse that retains minimal operational characteristics so that it passes the fuse test. These may be inadequately programmed, or over-programmed so that they will fail later in circuit.

Family Code — A 2- or 3-digit hexadecimal number that groups devices by their programming algorithms. When combined with the pinout code, the family code identifies the device you are using to the programmer.

Family/Pinout Code — Two- or three-digit codes used by some Data I/O programmers to identify programming variables including pinout, address limit, and programming algorithms. Several similar devices can share the same, valid family/pinout code. And, because similar devices do not always share the same characteristics, some device checks will not be performed if you select a device with family/pinout codes. Thus, if you want specific device checks to be performed, you should select the device by manufacturer/part number.

File Transfer Operations — An operation involving the transfer of data between the programmer and a host. Upload and download are file transfer operations.

Filename — The name of the disk file to use during file operations. The filename must follow standard DOS conventions: up to eight alphanumeric characters, followed by an optional three-character file extension, with the two fields separated by a period. An example of a valid filename would be **27256.dat** or **filename.c**.

Fuse Verification — A type of post-programming device check that checks the fuse pattern programmed into a logic device with the pattern in user memory.

Fusemap — The fuse-level description portion of a programmable integrated circuit. Fusemaps are typically files in JEDEC Standard #3A and are downloaded to PLD programmers for device implementation.

Handshaking — The required sequence of signals for communication between two units. The I/O bus protocol for a unit defines its handshaking requirements. This is especially true for asynchronous I/O systems in which each signal requires a response to complete an I/O operation.

High-speed Download — A special feature of the programmer that allows the programmer to download data from a PC at 115.2K baud. To take advantage of this feature, you must be using HiTerm on a PC, you must enable the High Speed Download parameter, and you must send User Menu Data to the Remote port.

High-speed Logic Drivers — A device test that increases the speed of the logic transitions between 0 to 1 and 1 to 0 of the test vector input states. This test is a diagnostic tool designed to help debug and classify test vector failures. Specifically, this test is designed to help identify vector transitions that are speed dependent.

Host — A micro, mini, or mainframe computer used to control the programmer in Remote mode. You must use a software driver, such as Data I/O's PROMlink to allow the computer to communicate with the programmer.

Host Command (download & upload) — The command that is sent from the programmer to the host system during uploading/downloading. See Download Host Command and Upload Host Command.

I/O Address Offset — This value influences the beginning address where data is stored during a file transfer operation. For uploads, the I/O Offset represents the address to start loading a formatted data file. For downloads, the I/O Offset is subtracted from the beginning address in the formatted data file. The result is then added to the memory begin address to determine where the block of data is loaded.

I/O Timeout — The amount of time that the programmer will wait for a data transfer to begin.

I/O Translation Format — See Data Translation Format.

Illegal Bit — An illegal bit is when a device contains a programmed location and the data file specifies that the location should be unprogrammed.

Illegal Bit Check — A test that determines whether or not a socketed device contains any illegal bits.

Instrument Control Code — A 1-digit number that signals or controls data transfers. It also implements a form of remote control that provides peripherals with flow control beyond that provided by software handshaking.

JEDEC — Joint Electron Design Engineering Committee: a committee of programmer and semiconductor manufacturers that provide common standards for programmable issues. Examples include: acceptable test characters for PLDs and standard data transfer/programming formats for PLDs. JEDEC Standard #3 is the industry standard for PLD formats.

JEDEC Standard #3A — The standard PLD data translation format, as defined by JEDEC for PLD design software to communicate with PLD programmers. It defines the states of all fuses in the device (the fusemap) and may include test vectors for DEVICE testing.

JEDEC I/O translate DIP/LCC Vectors	A feature on the programmer that translates test vectors for a device from its DIP package to its PLCC/LCC package, allowing for the different pinouts of the two package types.
Job File	A sequence of keystrokes that have been stored in a disk file and that can be played back at a later time.
LCA	An acronym for Logic Cell Array.
LCC	An acronym for Leadless Chip Carrier. A type of device package. A 4-sided ceramic package with pads on the underside for surface mount applications.
LED	An acronym for Light Emitting Diode. The programmer has five LEDs: four on the top cover and one on the disk drive.
Load Data	A device operation that moves device data into the programmer. You can load the programmer with data from a device, from the programmer's internal disk drive, or from a serial port (for example, from the Remote port).
Load Device	A device operation that copies data from a master device into User memory.
Logic Verification	After programming a device, you can select test vector verification, fuse verification, or both types of verification.
Master Device	A device that contains data you wish to program into another device. For example, you would load data from a master device and then program that data into a blank device.
MatchBook	A new type of socketing technology that makes handling surface-mount devices easier.
Memory Begin Address	The first address, in hex, of the first byte of data to be used in device operations. If the data source/destination is RAM, the memory begin address is a RAM address. If the data source/destination is disk, the memory begin address is the offset for a disk file.
Message Bar	The fourth line of the screen. The programmer displays system and error messages in the message bar. The action symbol is also located in the message bar.
Next Device	Used during serial set programming, this value specifies the next device in the set. For example, if you are using 8-bit devices and have specified a word width of 16 bits, it will require two devices to store each 16-bit word. Depending on the value entered, the data programmed into the next device will come from either even addresses or odd addresses.

Non-default Parameters Also referred to as the Simple Parameter screen, the Non-default parameters screen displays a selected group of parameters on a parameter entry screen. To display all the available parameters, select the All Parameters screen, which is also referred to as the Complex Parameters screen.

Odd/even Byte Swap Used during device operations for 16-bit devices, this option swaps the Most Significant Bytes (MSB) and the Least Significant Bytes (LSB) of 16-bit words. The programmer stores RAM data and disk file data with the convention that the LSB of a 16-bit word resides in the even byte of memory.

Online Help Available throughout the programmer, the help screens provide you with both general help and context-sensitive help. The Help screen is divided into four sections: the key listing, the general help, the specific help, and the reminder bar.

Output Record Size The number of data bytes contained in each data record during upload.

Overblow A condition in which fuses are blown that should not have been.

Overblown Fuse A fuse that has been over-programmed such that the surrounding area may have been damaged or such that fuse material splatter was created. Splatter (or rattlers) can cause intermittent shorting.

PAL An acronym for Programmable Array Logic. PALs are devices with programmable AND and fixed OR arrays. This is a slightly different architecture from a PROM or an FPLA. Other examples of PAL-type architectures from other manufacturers include PEEL and GAL.

Parallel Test Vector Application Use of internal registers to hold and release a full set of test vectors (e.g., 20 for a 10-input 10-output device) at once. In contrast to serial application, parallel does not require accommodations for clocking contention, and parallel better matches in-circuit PLD operation and board test suites.

Part Number The number on the device. For example if you are using an Intel 27C256, then the part number of the device is 27C256.

Pin-driver The electric circuit reading or applying voltage and current pulses to the individual pin of a device, for programming or testing. See also Universal Pin Driver.

Pinout Code A 2- or 3-digit hexadecimal number that helps identify a device by its pinout. When combined with the family code, the pinout code identifies the device you are using to the programmer.

PLCC An acronym for Plastic Leaded Chip Carrier. A device package with J-shaped leads extending from four sides downward, used for surface mount applications.

PLD — An acronym for Programmable Logic Device. A particular type of programmable integrated circuit. Architectures range from being very simple to very complex. Most PLDs contain two levels of logic, an AND array followed by an OR array.

PROM — An acronym for programmable read-only memory. A device with fixed AND and programmable OR arrays. This is a slightly different architecture from an FPLA or a PAL.

Program — The controlled application of electrical pulses to program specific fuses or cells.

Program Device — A device operation that copies device data into a socketed device. The programming is done according to the programming algorithm selected in the select device stage. The programming operation can also include a verify operation.

Program Security Fuse — A programming parameter that enables/disables the programming of the device's security fuse.

Program Signature — Available on only a few devices, the Program Signature is a user-definable field that allows the user to program data into the program signature array. For example, the Program Signature could contain the revision level or modification date of the data in the remainder of the device.

Programmable Integrated Circuit — One of the four basic categories of ASICs: the other three being gate arrays, standard cells and full custom devices. PICs are ICs that are user configurable. PLDs and PGAs are examples of programmable integrated circuits.

Reboot — The process of re-initializing the programmer. After rebooting, the programmer is in the same state as if it had just been turned on.

Registered Devices — Devices that contain registers, rather than being combinatorial only. Registered devices are typically used for sequencers and state machine designs. Typical examples are 16R8, 82S159 and 22V10.

Reject Option — A post-programming device check that pulses the programmed device with voltage to see if the device has programmed per specification. The number of times a device is pulsed varies by manufacturer and by the reject option you select.

Reminder Bar — The bottom line of the screen. The reminder bar tells you what function keys are available and what they will do if pressed.

Remote Mode — The programmer is controlled from a host running a driver program. Device data files can be stored on the programmer's disk and on the host.

Security Fuse — A location in a programmable device that, when programmed, secures the device from readback: the data in the device is unreadable.

Security Fuse Data	The actual data to program into the device's security fuse.
Select Device	A procedure that tells the programmer what device you will be using. You can select a device in one of two ways: by entering the family/pinout code, or by selecting the manufacturer and the device part number.
Self-test	A built-in self-diagnosis command that allows you to test various circuits and subsystems in the programmer, verifying proper operation or isolating possible problem areas.
Serial Set	A method of set programming in which the devices of the set are programmed one at a time instead of all at once.
Serial Test Vector Application	The process of applying test vectors in a serial fashion, one input at a time.
Serial Vector Test	A device test that applies test vector input states serially, starting with pin one and stepping through the remaining pins. This test is a diagnostic tool designed to help debug and classify test vector failures. Specifically, this test is designed to isolate test vectors that are sequence dependent.
Set Programming	A type of programming where a large data file is partitioned and programmed into multiple memory devices.
Simple Parameter Screen	See Non-default parameters.
SmartPort	A feature of the programmer that automatically detects and adjusts the programmer to the presence of DCE/DTE protocol.
Source	The place from which something comes. The "something" the source is sending is almost always data. The "where" can be RAM, a disk file, or one of the programmer's serial ports.
Status Window	The top three lines of the screen. The following information is displayed in the status window: the name of the data file, the amount of user RAM, the version numbers of the algorithm/system disk, the device manufacturer and part number, the family/pinout code, and the data translation format.
Structured Test Vectors	A string of test conditions applied to a PLD in a programmer/tester to stimulate inputs and test outputs to ensure functionality. A test vector is one such string, e.g., 20 characters for a 20-pin PLD, with 10 input signals and 10 expected outputs.
Structured Test Vectors (design)	Structured vectors created by the design engineer to confirm that the design is operating as intended. e.g., that a 10-bit counter is counting to 10. Design vectors are used both in preprogramming simulation and in manufacturing.

Structured Test Vectors (device)

Structured vectors created by the design engineer, test engineer or an automatic test vector generation program, which confirm that the device is operating properly after programming, e.g., that nothing can happen in the device to prevent the 10-bit counter from operating correctly. An exhaustive set of device vectors will assure that no undetectable faults may occur.

Sumcheck

A 4- or 8-digit hexadecimal number that, when compared to the original data, allows you to verify that a copy of the data matches the original data. Memory devices have 8-digit sumchecks and logic devices have 4-digit sumchecks. For devices in a set, you can calculate the individual sumcheck of the device and the sumcheck of the entire set.

Terminal Emulator

A program to enable a PC or other computer to act as an ASCII terminal. Allows a PC to be used to communicate with a programmer in terminal mode or with a mainframe.

Terminal Mode

One of the programmer's three operating modes. The programmer is controlled from either a dedicated terminal or from a workstation running a terminal emulation package. Device data files can be stored on the programmer's disk (and on the workstation).

Test Vector

Test vectors functionally test the device, using structured test vectors stored in memory or in a disk file.

Test Vector Stretching

Conversion of DIP test vectors to equivalent PLCC test vectors by adding don't care vector characters into the string to correspond with the PLCC's dead pins.

Total set size

Used during serial set programming, this value specifies how many devices are in a set.

Translate DIP/LCC Vectors

See JEDEC I/O translate DIP/LCC Vectors

Translation Formats

A form of transmission protocol, these formats are used when transferring data between the programmer and a host computer. The different formats represent different ways of encoding the device data in a data file. The data file could contain the fuse pattern for a logic device or the data for a memory device.

Transmit Pacing

The number of milliseconds the programmer will insert as a time-delay between characters transmitted to the host computer during uploading. The time delay is specified in tenths of milliseconds.

Transparent Mode — One of the programmer's three operating modes. The programmer is controlled from either a dedicated terminal or from a workstation running a terminal emulation package. In addition, the Remote port is connected to a host computer or file server. The programmer performs all of its programmer operations, and can act as a transparent link between the terminal/workstation and the host, eliminating the need for a switch box. Thus, you can control both the programmer and the host from the same terminal/workstation. With one exception, all key strokes entered on the terminal will be passed directly to the host. The exception is the Escape command.

Underblow — A condition in which fuses that should have been blown or programmed were not.

Underblown Fuse — A fuse that did not disconnect as per manufacturer's specifications. These fuses may test properly but tend to be more prone to grow back when in circuit, rendering the PLD useless.

Universal PLD Programmer — A programmer that can apply power, ground, and any programming pulse required to program any fuse technology device.

Upload Data — A file transfer operation that involves sending data from the programmer to a host.

Upload Host Command — A command that is sent from the programmer to the host during an upload. The command tells the host what to do with the incoming data.

Upload Wait — The length of time the programmer will wait before it begins sending data to the host computer after the host upload command is sent.

User Data Size — The hexadecimal number of bytes of a data block to use for a device operation. Normally, this value is equal to the device size. During serial set operations, this value works with Total Set Size to determine the total amount of bytes to program into a set of devices.

User memory — The workspace used during device operations. It can be either internal RAM or a disk file. Normally, RAM is used for small, quick device operations, such as programming a single device, while disk is used for larger device operations, such as serial set programming.

User Menu Data — The information you see when you look at the programmer screen. It includes the dialog window, reminder bar, message bar, etc.

User Menu Port — The port the user menu data is sent to. You can re-direct user menu data to either the Terminal port of the Remote port.

User RAM — The RAM in the programmer. User RAM can be used as a source/destination for an operation. Several operations use User RAM as a a temporary storage buffer, overwriting any data that may have been there previously.

Universal Pin Driver — A pin driver with the ability to supply power and ground to every pin. With Universal Pin Drivers, you can program and test devices with out having to use pin out adapters and characterizers.

Verify Device — A device operation that compares data in a programmed device with data in RAM or in a disk file. With logic devices, verifying can also include functional testing. Verify is an automatic part of the program operation, but additional verify operations can provide useful information about any errors.

Verify Pass — A verify pass is a trip through a device at a specified Vcc to see if the device programmed properly. The pass is usually done once at 5V. The pass can also be done twice, with the first pass at 5.5V and the second pass at 4.5V.

Waveforms — Images of the programming pulses that program a device. Usually created by programmer manufacturers and submitted to device manufacturers as part of the approval process and to record the correct programming spec for a specific device.

Wildcard — Used when entering filenames, a wild card represents one or more characters in a filename. For example, **27*.dat** represents both **27512.dat** and **27128.dat**.

Workstation — A PC, or other micro computer, used for local control of the programmer. You must use terminal emulation software, such Data I/O's HiTerm, to allow the programmer and the PC (or other micro) to communicate. The programmer is designed to be compatible with all popular design workstations, including both DOS and UNIX-based workstations.

Yield — The percentage of successfully programmed devices.

Yield Tally — The yield tally function keeps track of the programming statistics for the last 16 types of devices programmed. The following statistics are kept for each device type: the manufacturer name and part number, the family/pinout code, the number of devices attempted, the number of devices that programmed successfully, the number of devices that failed non-blank test or illegal bit check, the number of devices that failed to verify, the number of devices that could not be programmed because they contained bits that required more programming pulses than were specified, and, for logic devices only, the number of devices that failed structured vector test.

ZIF Socket — An acronym for Zero Insertion Force. A socket in which the device can be dropped in and engaged via a lever.

Keep Current™ Express

Subscription Service

User Manual

DATA I/O

November 1992

Data I/O has made every attempt to ensure that the information in this document is accurate and complete. Data I/O assumes no liability for errors, or for any incidental, consequential, indirect or special damages, including, without limitation, loss of use, loss or alteration of data, delays, or lost profits or savings, arising from the use of this document or the product which it accompanies.

No part of this document may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose without written permission from Data I/O.

Data I/O Corporation
10525 Willows Road N.E., P.O. Box 97046
Redmond, Washington 98073-9746 USA
(206) 881-6444

Acknowledgments:

Data I/O is a registered trademark of Data I/O Corporation.
UniSite, AutoSite, PROMlink, and Keep Current are trademarks of Data I/O Corporation.
Courier HST Dual Standard is a trademark of U.S. Robotics.

Data I/O Corporation acknowledges the trademarks of other organizations for their respective products or services mentioned in this document.

© 1992 Data I/O Corporation
All rights reserved

1 Introduction

The Keep Current™ Express subscription service keeps your programmer and documentation up-to-date with the latest features and device support. You receive quarterly update kits that incorporate all changes since the previous update, and you gain immediate access to new and improved programming algorithms via the Keep Current Bulletin Board System (BBS). As a Keep Current Express subscriber, you can obtain new and updated device algorithms up to three months before they are incorporated in a quarterly update kit.

Semiconductor companies constantly introduce new devices and issue specification changes for existing devices. Incorporating these changes swiftly in your UniSite™, 2900, 3900, AutoSite™, or AutoSite/E™ ensures that you obtain the highest programming yields and best device reliability possible.

System Requirements

Before you can access the Keep Current algorithms from the BBS, you must take several preparatory steps.

Programmer

To use the Keep Current algorithm feature, you must have the latest version of the programmer software.

PC

You must have the following hardware to access the Keep Current BBS:

- An IBM PC, or compatible, with a 3.5-inch floppy drive (high-density 1.44MB floppy drive if your programmer is the 2900, 3900, AutoSite, or AutoSite/E) or with a serial interface to the programmer
- A double-sided/double-density (DS/DD) 3.5-inch disk formatted on UniSite or a high-density (HD) 1.44MB disk formatted on the 2900, 3900, AutoSite, or AutoSite/E

Modem

To access the Keep Current BBS you need the following:

- Telecommunication software and a modem. The BBS supports 1200/2400/9600/19200 baud with a U.S. Robotics Courier HST Dual Standard V.32*bis*/V.42*bis* modem set to 8 data bits, 1 stop bit, and no parity.
- Your telecommunication software must support one of the following binary file transfer protocols:
  - Xmodem
  - Ymodem
  - Zmodem
  - Kermit
  - HS/Link

Compatibility

PROMlink

You must have PROMlink version 6.0 or later to select Keep Current algorithms from within PROMlink. To select a Keep Current algorithm in PROMlink, bring up the device selection window and select KEEP_CURRENT. A window with the available Keep Current algorithms is displayed.

TaskLink

You must have TaskLink version 1.0 or later to select Keep Current algorithms from within TaskLink. To select a Keep Current algorithm in TaskLink, bring up the device selection window and select KEEP_CURRENT. A window with the available Keep Current algorithms is displayed.

Keep Current Algorithms and Software Updates

Each Keep Current algorithm is designed to work with a particular version of system software. When your programmer displays the available Keep Current algorithm(s) on the Keep Current Part List screen, it filters out the Keep Current algorithms that are invalid and incompatible with the installed version of system software.

A Keep Current algorithm and a version of your programmer's system software are compatible when the numbers to the left and immediate right of the decimal point match. See the following example.

Algorithm Version	System Software Version	Compatible
3.51	3.5	Yes
3.7	3.7	Yes
3.6	3.7	No

Keep Current algorithms are valid for one major release of software because they will be included with the next release of system software.

2 Using Keep Current Express

Logging On to the Keep Current BBS

Before you can log on to the BBS, you must have your telecommunications software and modem installed and operating. Refer to your telecommunications software manual and your modem manual for setup procedures.

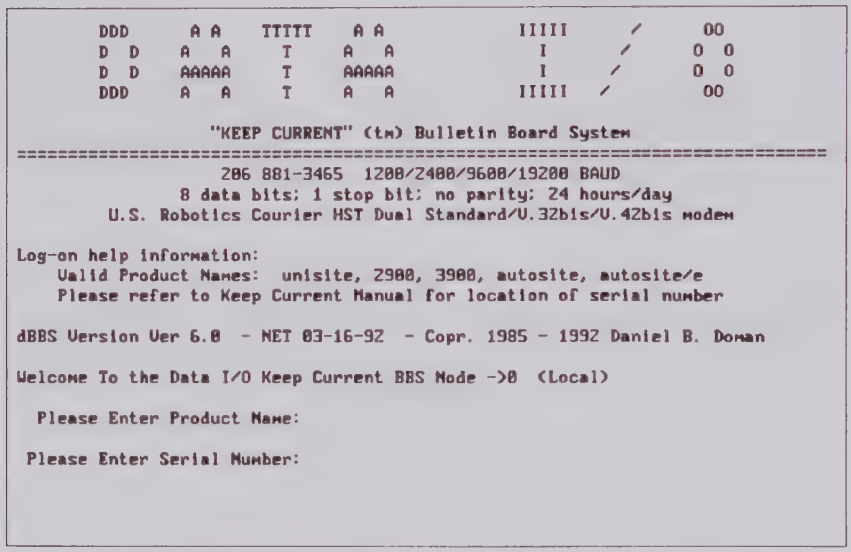
Have the following information available prior to contacting the BBS:

- **Programmer name** (UniSite, 2900, 3900, AutoSite, or AutoSite/E)
- **Programmer serial number** (located on UniSite's back panel and on the bottom of the 2900, 3900, AutoSite, and AutoSite/E)
- **Programmer system ID.** To find this number, from the main screen on the terminal connected to your programmer, enter [M] (More), [C] (Configure), [U] (Update).
- **File transfer protocol** (used by your telecommunication software)

Use the following procedure to log on to the Keep Current BBS.

1. To contact the Keep Current BBS, call one of the following numbers:
   - +1-206-881-3465 (United States)
   - +44-(0)734-448913 (United Kingdom)
   - +49-(0)89-8585880 (Germany)
   - +81-3-3436-0205 (Japan)
2. Wait for the logon screen to appear, similar to the one shown in Figure 2-1.

Figure 2-1
Sample BBS Logon Screen


DDD A A TTTTT A A IIIII / 00
D D A A T A A I / 0 0
D D AAAAA T AAAAA I / 0 0
DDD A A T A A IIIII / 00
"KEEP CURRENT" (tm) Bulletin Board System
206 881-3465 1200/2400/9600/19200 BAUD
8 data bits; 1 stop bit; no parity; 24 hours/day
U.S. Robotics Courier HST Dual Standard/V.32bis/V.42bis modem
Log-on help information:
Valid Product Names: unisite, 2900, 3900, autosite, autosite/e
Please refer to Keep Current Manual for location of serial number
dBBS Version Ver 6.0 - NET 03-16-92 - Copr. 1985 - 1992 Daniel B. Doman
Welcome To the Data I/O Keep Current BBS Node ->0 (Local)
Please Enter Product Name:
Please Enter Serial Number:

3. Type your programmer's name (**unisite, 2900, 3900, autosite**, or **autosite/e**) at the following prompt:

   Please Enter Product Name: *xxxxxxxx* ↵ .

4. Type your programmer's serial number at the following prompt. The serial number is located on UniSite's back panel and on the bottom of the 2900, 3900, AutoSite, and AutoSite/E.

   Please Enter Serial Number: *xxxxxxxxxx* ↵ .

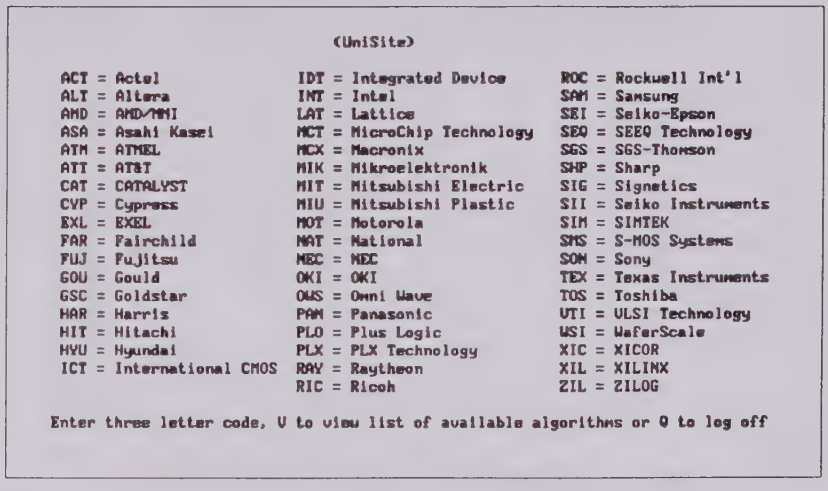
5. The first time you log on to the Keep Current BBS, you are prompted for additional information.

Note: If you have difficulty performing the logon operation, contact your Data I/O Customer Support office as listed in the Preface of your programmer User Manual.

Downloading a Keep Current Algorithm

After a few seconds, the second Keep Current BBS screen appears, similar to that shown in Figure 2-2. This screen displays all manufacturers currently supported on your programmer.

Figure 2-2
Keep Current Manufacturer Select Screen

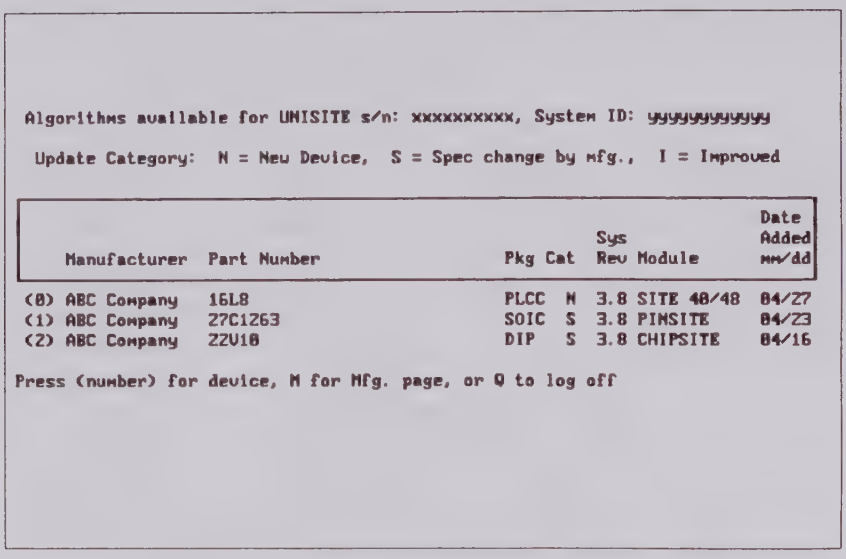


Your programmer's name appears at the top-center of the screen. At this point, you can do the following:

- Select a manufacturer by typing its three-letter code. The screen in Figure 2-3 appears. (Figure 2-3 is an example of devices and modules available for UniSite.)
- View the currently available Keep Current algorithms by pressing [V] . This View screen lists the algorithms by part name and then by the date available on the Keep Current BBS. After you are finished viewing, press [M] to get back to the Manufacturer Select screen.
- Press [Q] to exit the Keep Current BBS.

After you have selected a manufacturer, the Algorithm Select screen appears, similar to the one as shown in Figure 2-3.

Figure 2-3
Keep Current Algorithm Select Screen


Algorithms available for UNISITE s/n: xxxxxxxxxx, System ID: yyyyyyyyyyyy
Update Category: N = New Device, S = Spec change by mfg., I = Improved
Manufacturer Part Number Pkg Cat Sys Rev Module Date Added mm/dd
(0) ABC Company 16L8 PLCC N 3.8 SITE 48/48 04/27
(1) ABC Company 27C1263 SOIC S 3.8 PINSITE 04/23
(2) ABC Company 22V10 DIP S 3.8 CHIPSITE 04/16
Press (number) for device, M for Mfg. page, or Q to log off

Keep Current algorithms are listed on this screen, and the following information is included:

Item	Description
Manufacturer	Manufacturer of the device
Part Number	Device number
Pkg	Package type
Cat	One of three update categories, N (New device — a device not previously included on the programmer Algorithm disk), S (Specification update by manufacturer), or I (Improved programming algorithm)
Sys Rev	The required system software version
Module or Base	The required module or base to program a device
Date Added mm/dd	The date the algorithm was placed on the Keep Current BBS

Note: A module (UniSite, AutoSite, and AutoSite/E) or a base (2900 and 3900) may be required. The required module or base will be indicated under the Module or Base column. The above example shows the modules required for devices programmed with UniSite.

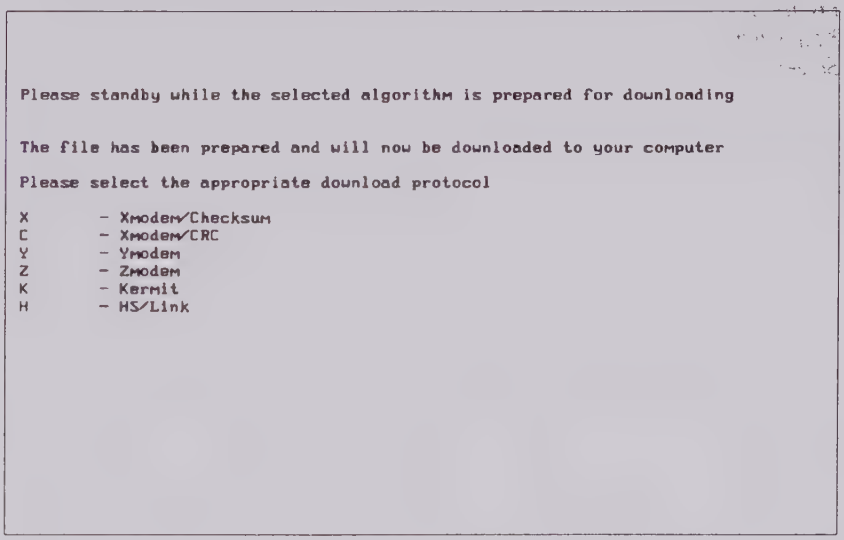
Locate the algorithm you want to download from the Keep Current BBS, and follow the steps below to download the algorithm to your PC.

1. Identify the algorithm by the number in parentheses to the left of the Manufacturer.
2. Type the number of the algorithm at the following prompt:

   Press (number) for device, M for Mfg. page, or Q to log off

The screen shown in Figure 2-4 appears, indicating that the BBS software is preparing to download the algorithm to your PC.

Figure 2-4
Select the Download Protocol Screen


Please standby while the selected algorithm is prepared for downloading
The file has been prepared and will now be downloaded to your computer
Please select the appropriate download protocol
X - Xmodem/Checksum
C - Xmodem/CRC
Y - Ymodem
Z - Zmodem
K - Kermit
H - HS/Link

Note: Some devices require an adapter that you can order by contacting Data I/O Customer Support. If an adapter is required, a screen will appear indicating the correct adapter and the necessary file (ADAPTERS.SYS) that will be automatically downloaded when the algorithm is selected for download.

3. Select the same protocol in your telecommunications software.
4. Choose the appropriate download protocol by entering the corresponding letter at the prompt to begin the file download process.

The selected algorithm is downloaded to your PC.

When the algorithm has been successfully downloaded, you are returned to the Manufacturer Select screen shown in Figure 2-2. You may choose another algorithm to download or press [Q] to log off the Keep Current BBS.

Uncompressing a Keep Current Algorithm File

The downloaded file is a self-extracting compressed file called *vv_zzzzz*.exe where *vv* is the version number of the file and zzzzz is the device reference number.

You must run this file on your PC to uncompress it. Uncompressed, the file generates up to four additional files.

File Name	File Description
vv_zzzzz.KC*x*	Algorithm file
ADAPTERS.SYS	System file, present only if the device requires new hardware
DEVFNOTES.SYS	System file, present only if the device requires new footnotes
FNTBL.SYS	System file, present only if the device requires new footnotes

The KC*x* extension indicates that this is a Keep Current (KC) algorithm where *x* is the version letter of the Keep Current algorithm. The version number *vv* indicates the required version of system software. The .KC*x* file and .SYS files are then transferred to a 3.5-inch disk that has been previously formatted in your programmer.

With a 3.5-inch Drive on the PC

If you have a 3.5-inch drive on your computer, to uncompress and transfer the resulting files, use the following command:.

filename d: (for example, 36_3284 D:)

Note: Drive d: is the drive containing the 3.5-inch disk. Substitute the appropriate drive letter if your 3.5-inch drive is configured for a disk drive other than D.

If you have existing .SYS files on your disk, you are prompted to overwrite these files; answer Yes to ensure that you use the latest system files.

Without a 3.5-inch Drive on the PC

If you do not have a 3.5-inch drive on your computer, use the following steps to uncompress and transfer the files to the programmer's disk.

1. Create a subdirectory (for example, kcfiles) under the directory containing the downloaded file *vv*_zzzz.exe.
2. Uncompress *vv*_zzzz and transfer the resulting files to the subdirectory you created using the following command:

   filename path (for example, 34_3284 kcfiles)
3. Power up your programmer in Terminal mode and put your PC in terminal emulation mode. Go to the More/Transfer/Download screen and select I/O translation format 16 (Absolute Binary). Select Disk as the destination.
4. Insert your 3.5-inch disk (formatted on the programmer) into the programmer disk drive.

5. One by one, download all files that were created by uncompressing *vv_zzzz* in step 2. Refer to the Download data in the More commands section of your User Manual for more information. After all files are downloaded, you may delete all files in the subdirectory kcfiles.

Note: For each download operation, set the User Data Size to 0 which directs the programmer to receive all the data in the file.

Selecting a Keep Current Algorithm

Once you have transferred or downloaded the appropriate files to a disk, label it **Keep Current Algorithms**. Include the required system software version in the description. Use this disk instead of the regular algorithm disk to select a Keep Current algorithm.

To select a Keep Current algorithm:

1. Remove the regular algorithm disk from your programmer and replace it with the Keep Current algorithm disk. Make sure you are using the correct version of system software.
2. From the Main Menu, press [S] (Select Device) to display the Manufacturer's menu.
3. Select KEEP CURRENT from this menu. All available Keep Current algorithms are displayed.

From this point forward, the operation is the same as using a regular algorithm. Refer to your programmer User Manual for details.

Sample Keep Current Scenario

The following example illustrates a typical Keep Current scenario:

1. In May, you update your system software to version *x*.4. At the same time, you purchase the Keep Current Express Subscription Service.
2. In June, Cruft Technologies announces a new device, the Cruft 1263.
3. A week later, Data I/O announces support for the Cruft 1263 and places a Keep Current algorithm for the Cruft 1263 on the Keep Current BBS.
4. The next day, you call the Keep Current BBS and download the new algorithm for the Cruft 1263.
5. In August, Data I/O releases version *x*.5 system software, complete with the new algorithm for the Cruft 1263.
6. You update your UniSite to version *x*.5 system software. The algorithm for the Cruft 1263 is part of the system software.

With Keep Current algorithms, you get immediate device support, rather than having to wait for the next release of system software. For more information on using the Keep Current algorithm, see one of the following sections in the *UniSite User Manual*, the *2900 User Manual*, or the *3900 User Manual:* "Tutorial"—Session 3 in Chapter 4, "Commands"—Select Device in Chapter 5, "CRC"—n4D], xxx...xxx33], xxx...xxx34], and xxx...xxx3E] commands in Chapter 6.

If you are using AutoSite, see one of the following sections in the *AutoSite User Manual*: Chapter 3, "Operation," CRC commands—n4D], xxx...xxx33], xxx...xxx34], and xxx...xxx3E] in Appendix A.

If you are using AutoSite/E, see CRC commands n4D], xxx...xxx33], xxx...xxx34], and xxx...xxx3E] in Appendix A of the *AutoSite/E User Manual.*

Programmer Suggestion/Problem Report

If you have a suggestion for improving a Data I/O programmer, or encounter a fault in its operation, please complete this report and return it to Data I/O. Thank you for your input.

Date submitted _____

FOR DATA I/O USE ONLY
Data I/O Reference Number _____ Entered by _____

Customer Information

Name _____ Title _____
Company _____ Department _____
Address _____ Mail Stop _____
City _____ State _____ ZIP/Postal Code _____
Country _____ Phone ( ) _____
Network Address _____ Fax Number ( ) _____

General Information

Device Manufacturer _____ Device Part Number System RAM Installed _____
System Software Version _____ Algorithm Version Serial Number _____
How critical is this problem to you? ❑ Extremely ❑ Moderately ❑ Low impact
Is your programmer covered by a support agreement? ❑ Yes ❑ No

UniSite Information

Modules installed
❑ Site 40 ❑ Site 48 ❑ ChipSite
❑ PinSite ❑ SetSite ❑ Other _____

Number of pin drivers installed _____ System EPROM Version _____
Second disk drive installed? ❑ Yes ❑ No

2900 Information

Libraries installed
❑ Up to 28 pin E/EPROMs ❑ All E/EPROMs ❑ All PROMs
❑ All Micros ❑ Up to 24 pin PLDs ❑ Up to 28 pin PLDs
❑ All PLDs ❑ Non-DIP Base ❑ Other _____

3900 Information

Libraries installed
❑ All E/EPROMs ❑ All PROMs ❑ All Micros
❑ Up to 24 pin PLDs ❑ Up to 28 PLDs ❑ Up to 44 pin PLDs
❑ Up to 68 pin PLDs ❑ All PLDs ❑ Non-DIP Base
❑ Other _____

AutoSite Information

Libraries installed
❑ 300 mil DIP ❑ 600 Pin PLCC ❑ 20 Pin PLCC
❑ 28 Pin PLCC ❑ 32 Pin PLCC ❑ 44 Pin PLCC
❑ 52 Pin PLCC ❑ 68 Pin PLCC ❑ 84 Pin PLCC
❑ Other _____

Description of Problem/Symptoms

Use the back of this report to describe the problem and the steps necessary to create it. Include references to the menu screen where the problem appears, I/O format, device type (manufacturer and number) and system defaults. Include an example on disk, if appropriate. Return your completed report to your local Data I/O representative or the nearest Data I/O Customer Support office. (Refer to the Preface in your *User Manual* for information on how to contact Data I/O.)

DATA I/O

Describe problems and/or symptoms below.

FOR DATA I/O USE ONLY

Manual Update _____ Date Completed _____

Code _____ Date Completed _____

Test Procedures _____ Date Completed _____

Retest _____ Date Completed _____

Close Date _____ Date Completed _____

Programmer Suggestion/Problem Report

If you have a suggestion for improving a Data I/O programmer, or encounter a fault in its operation, please complete this report and return it to Data I/O. Thank you for your input.

Date submitted _____

FOR DATA I/O USE ONLY
Data I/O Reference Number _____ Entered by _____

Customer Information

Name _____ Title _____
Company _____ Department _____
Address _____ Mail Stop _____
City _____ State _____ ZIP/Postal Code _____
Country _____ Phone ( ) _____
Network Address _____ Fax Number ( ) _____

General Information

Device Manufacturer _____ Device Part Number System RAM Installed _____
System Software Version _____ Algorithm Version Serial Number _____
How critical is this problem to you? ❑ Extremely ❑ Moderately ❑ Low impact
Is your programmer covered by a support agreement? ❑ Yes ❑ No

UniSite Information

Modules installed
❑ Site 40 ❑ Site 48 ❑ ChipSite
❑ PinSite ❑ SetSite ❑ Other _____

Number of pin drivers installed _____ System EPROM Version _____
Second disk drive installed? ❑ Yes ❑ No

2900 Information

Libraries installed
❑ Up to 28 pin E/EPROMs ❑ All E/EPROMs ❑ All PROMs
❑ All Micros ❑ Up to 24 pin PLDs ❑ Up to 28 pin PLDs
❑ All PLDs ❑ Non-DIP Base ❑ Other _____

3900 Information

Libraries installed
❑ All E/EPROMs ❑ All PROMs ❑ All Micros
❑ Up to 24 pin PLDs ❑ Up to 28 PLDs ❑ Up to 44 pin PLDs
❑ Up to 68 pin PLDs ❑ All PLDs ❑ Non-DIP Base
❑ Other _____

AutoSite Information

Libraries installed
❑ 300 mil DIP ❑ 600 Pin PLCC ❑ 20 Pin PLCC
❑ 28 Pin PLCC ❑ 32 Pin PLCC ❑ 44 Pin PLCC
❑ 52 Pin PLCC ❑ 68 Pin PLCC ❑ 84 Pin PLCC
❑ Other _____

Description of Problem/Symptoms

Use the back of this report to describe the problem and the steps necessary to create it. Include references to the menu screen where the problem appears, I/O format, device type (manufacturer and number) and system defaults. Include an example on disk, if appropriate. Return your completed report to your local Data I/O representative or the nearest Data I/O Customer Support office. (Refer to the Preface in your *User Manual* for information on how to contact Data I/O.)

DATA I/O

Describe problems and/or symptoms below.

FOR DATA I/O USE ONLY

Manual Update		Date Completed	
Code		Date Completed	
Test Procedures		Date Completed	
Retest		Date Completed	
Close Date		Date Completed	

www.manualsplus.com
1020328